AUG 26 1930

THE GEOGRAPHICAL JOURNAL

Vol LXXVI No 2 August 1930

Address at the Annual General Meeting of the Society — Colonel Sir Charles Close 97

The Colour of Ruwenzori . . . . . Carveth Wells 110

The Vegetation of the Central Sahara . . . . . Dr. T. F. Chipp 126

The Mountains of Central Asia and their Nomenclature . Ph. C. Visser 138

Nomenclature in the Karakoram . . . Major Kenneth Mason 143

An Undescribed Map of Lopo Homem, 1519 . . . . . E. H. 159

Tables for the Prismatic Astrolabe: Review . . . . E. A. R. 161

Reviews The Monthly Record Obituary Meetings: 1929–1930

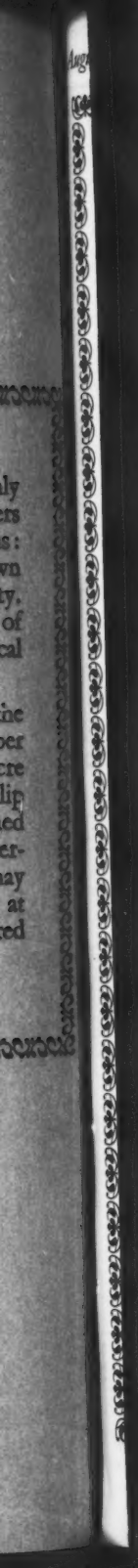
Society Notices . . . . . i, iii

Contents v

THE ROYAL GEOGRAPHICAL SOCIETY
KENSINGTON GORE LONDON S.W.7
EDWARD STANFORD LTD. 12 LONG ACRE W.C.2
AND 29 CHARING CROSS S.W.1
PRICE TWO SHILLINGS

THE GEOGRAPHICAL JOURNAL is published monthly by the Royal Geographical Society. It contains the papers read at the Meetings of the Society, with the discussions: illustrated with original photographs, and with maps drawn from the authors' surveys by the draughtsmen of the Society. It contains also Articles on geographical topics; Reviews of important books and maps; a Monthly Record of Geographical work; and occasional Letters from Correspondents.

The *Journal* is sent free each month to all Fellows of the Society, and is sold to the public at Two Shillings per number through Messrs. Edward Stanford Ltd. of 12 Long Acre W.C.2 and 29 Charing Cross S.W.1; Messrs. George Philip and Son Ltd. of 32 Fleet St. E.C.4; Messrs. Sifton, Praed and Co. Ltd. of 67 Saint James St. S.W.1; and the International News Company, New York City, U.S.A. It may also be ordered direct from the Office of the Society at Twenty-seven Shillings per year, post free. It is registered for transmission to Canada by Canadian Magazine Post.



CONTENTS

ADDRESS AT THE ANNUAL GENERAL MEETING OF THE SOCIETY. By the President, COLONEL SIR CHARLES CLOSE, K.B.E., C.B., C.M.G., SC.D., F.R.S. 97

THE COLOUR OF RUWENZORI. By CARVETH WELLS . . 110

THE VEGETATION OF THE CENTRAL SAHARA. By DR. T. F. CHIPP 126

THE MOUNTAINS OF CENTRAL ASIA AND THEIR NOMENCLATURE. By PH. C. VISSER 138

NOMENCLATURE IN THE KARAKORAM. By MAJOR KENNETH MASON 143

AN UNDESCRIBED MAP OF LOPO HOMEM, 1519. By E. H. 159

TABLES FOR THE PRISMATIC ASTROLABE: Review by E. A. R. 161

REVIEWS: History of Bradwell-on-Sea, Essex. Holidays in Sweden. Days on Dartmoor. The Economic Development of Post-War France. Spain. The Roads of Spain. Spain. Above and beyond Palestine. Memoirs of Travel, Sport and Natural History. China to Chelsea. Races of Africa. Big-Game Hunting and Collecting in East Africa, 1903–1926. Open-Air Studies in Australia. New Zealand in the Making. Ethnography. La Vie Héroïque et Romantique du Docteur Charles Cuny, Explorateur (1811–1858). The Works of Samuel de Champlain. John Franklin's Bride: Eleanor Anne Porden. Büch der Länder. The Canadian Geographical Journal 163

THE MONTHLY RECORD: British Polar Exhibition. The Siberian Meteor and Repercussions in England. Identity of Falls in Labrador. The Climates of Alaska. Forestry in Victoria. Alleged Falsification of Latitudes by Columbus 175

OBITUARY: Mr. Frank Burnett, LL.D. 180

MEETINGS: Session 1929–1930 180

MAPS:

Diagram of the Ruwenzori peaks to illustrate Mr. Wells's paper . 112
Vegetation belts of the West African Botanical Region . . . 126
Dr. Chipp's route into the Central Sahara 130

CASELLA

SURVEYING INSTRUMENTS

Catalogue and particulars post free on request

C. F. CASELLA & CO. LTD.

REGENT HOUSE, FITZROY SQUARE, LONDON, W.1

FRANCIS EDWARDS, LTD.

. . Booksellers, . .

83, High St., Marylebone, LONDON, W.1

Telephone: Welbeck 9221. Telegrams: Finality, Wesdo, London.

Speciality:—Books of Travel, Early Voyages, Explorations, Adventures, Natural History and Sport, Geography, Maps, etc., of all the Countries of the World.

Catalogues are issued at frequent intervals, and can be obtained post free on application.

Recently Issued

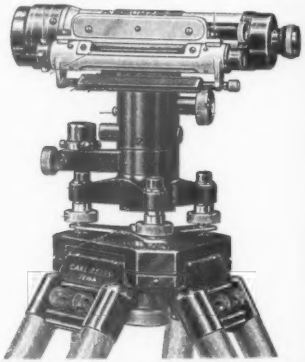
Bibliography.
Coloured Plate Books.
Military.
West Africa.
Library Sets of Standard Works.
Early English Literature.
Early Voyages, Shipbuilding, &c.
Newspapers, Magazines, &c.
Sport.

Small or large collections valued or bought.

ZEISS

LEVEL No. 2

is the ideal level for engineers and surveyors.



Magnification of × 31 with telescope length of only 8¼". **Weight** only 6lb. **Accuracy**—mean error of pointing ±0·4": hundredth foot divisions can be read at about 350 feet. Bubble sensitive to 20" per division, and can be centred to 1/40 division, corresponding to 0·4". Bubble reading is unaffected by expansion of liquid.

Full particulars in List 'G114L' from

CARL ZEISS (LONDON) LTD.

CARL ZEISS JENA **Winsley House, Wells Street, Oxford Street, London, W.1.** CARL ZEISS JENA

The GEOGRAPHICAL JOURNAL

Vol LXXVI No 2 R.G.S. *August 1930*

ADDRESS AT THE ANNUAL GENERAL MEETING

of the Society held on 23 June 1930, by the President

COLONEL SIR CHARLES CLOSE,

K.B.E., C.B., C.M.G., SC.D., F.R.S.

IN reviewing the events of the past year we shall desire first to pay a tribute of respect to the memory of those Honorary Members and Fellows of our Society whom we have lost by death during that period.

The thought of the tragic murder of our late Honorary Secretary still haunts us, for it is difficult to realize that his life of adventures in many parts of the world should have been thus ended in a moment in his Cambridge rooms. Recent speakers to his memory have testified to his brilliant work in Central Africa, in New Guinea, and in the Himalaya, for which five years ago he received our Patron's Medal. He had taken a very active part in all our plans for our new building. Indeed it was on his recommendation that we began the negotiations with Messrs. Kennedy and Nightingale which led to their appointments as architects. We had looked forward to his continuing his work for the Society as one of our Honorary Secretaries. The suddenness of our loss is emphasized by the necessity of issuing for to-day's meeting a second Balloting Paper, and we are grateful to Brigadier Jack for having consented, in the circumstances, to continue for another year in the office of Honorary Secretary.

In the autumn of last year we lost by the death of Sir Thomas Holdich a geographer whose services to the Society as President were as marked as his services to his country and to others. The admirable Memoir by Colonel Crosthwait and Major Mason, which was recently contributed to the *Journal*, makes it unnecessary to recount here his work on the Indian Frontier and his share in the great achievement of settling the disputed boundary between the Argentine and Chile. We may hope that some day a sympathetic biographer will write a full story of that arbitration of which the details are imperfectly known. The story would give a striking picture of political geography in perhaps its most interesting form.

By the death of Nansen who so long ago as 1891 received our Patron's Medal and in 1897 the Special Medal designed to commemorate his great polar adventure, the world has lost an heroic figure which will become legendary. His resolution in performing a feat carefully thought out against all conservative opinion captured the world's imagination: his resolution to leave the

ship when she would not go just the way he wanted: his dramatic appearance at Major Jackson's camp in Franz Josef Land: his return so well timed by good fortune to synchronize with the release of the *Fram:* all this endeared his Viking personality to geographers in particular but also to the larger world in which he played later so prominent a part.

The Earl of Balfour had honoured us by accepting our Honorary Membership in 1917 as one of the small group of eminent men who at that brave epoch were rendering high service to their country. His philosophical mind was perfectly adapted to appreciate the importance of science in public affairs, and it is possible that his ultimate reputation will rest as securely upon his encouragement of scientific research in the service of his country as upon those Parliamentary talents for which he was so greatly admired.

Mr. A. P. H. Hotz was a man of affairs, a diplomat in the service of the Netherlands, long resident in the Near East, and a student of Oriental history. For many years he had been a Fellow of our Society and many of our countrymen owe to him a debt of gratitude for his generous interpretation of responsibility for the care of the interests of British subjects in Turkish Territory during the war. Some years ago he generously offered to our Society the choice of books from his important library then housed in his villa at Lugano. A considerable part of the valuable early books in our Library have come to us by that gift, and there are further treasures, marked for us by the special bookplate, which he reserved for the delight of his last years, and which will now be added to our collection by the kind care of Mrs. Hotz.

H.H. Shum Shere Jung, the Maharaja of Nepal, was the enlightened ruler of that forbidden country to which the eyes of geographers have turned in vain. For many years a Fellow, he had recently been made one of our Honorary Members in recognition of his true sympathy with our science. Although unable to permit the passage of the Mount Everest Expedition through Nepal, he made a handsome personal contribution to its funds, and though unable to allow the presence of British officers of the Survey of India in his country, he was nevertheless keenly interested in arranging for its mapping by the Survey of India under Indian officers, and we await the results with keen interest to know what are the details of the southern flanks of the Chomo Lungma massif, whose northern precipices were so painfully familiar to the Mount Everest Expeditions. Geography, by his death, has lost a powerful friend on the Indian border.

Professor Yamasaki was a Vice-President of the International Geographical Union and took an active part in the Congress at Cambridge in 1928, of which Congress he was Vice-President. He had long been a leader in geography teaching and research in Japan, and it was with keen regret that we learnt of his death so soon after his last visit to Europe and America. Many of us feel that we have lost a good friend and geography has lost a distinguished exponent.

Sir Gilbert Clayton was a soldier of brilliant abilities and keen geographical interests, who had been for more than twenty years a Fellow of our Society. He was one of that active band of political geographers who worked in close union with our late President, Doctor Hogarth, in the Near East during the long years of war. His political missions to little-known parts of Arabia would have made remarkable papers for our meetings had he been allowed by political

conditions to tell us of them. His long experience and knowledge fully fitted him for the important position of High Commissioner in 'Iraq, to which he had been appointed, when his sudden death cut short his career at its summit.

Doctor Charles Hose had spent his life in the service of the Government of the Rajahs Brooke of Sarawak. During his many years of administration he had taken every opportunity of studying the geography and natural history of that interesting and then little-known territory, and the map which he laboriously compiled after his retirement and published in four sheets is a monument to his public spirit. He was a well-known figure for some years on our Council and upon the Rajah's Council in London.

Mr. George Goudie Chisholm was a striking example of that small class of students who have the talent and good fortune to found their reputations upon a single book of great merit. He had already published several editions of his *Handbook of Commercial Geography* when he was called to the Lectureship in Geography established in the University of Edinburgh in 1908. From that time he devoted much of his life to the service of the Royal Scottish Geographical Society, and the great value of his work to students was recognized by many awards of scientific societies.

In the field of exploration there has been much activity during the past year. Of the unexplored regions on this world's surface the first that would come to most minds is the great southern desert of Arabia, the Rub'al Khali, or Empty Quarter. This year, for the first time in history, a European has penetrated into this desert from the south. I allude to the remarkable journey undertaken by Mr. Bertram Thomas, Financial Adviser to H.H. the Sultan of Muscat and Oman, who with His Highness's approval and assistance travelled through some 200 miles of coastal area and actually reached, and for a short time travelled in, the Empty Quarter, and sent us a most interesting paper on his expedition.

Very important among the purely geographical expeditions was the twelve months' work in Labrador conducted by Mr. George Watkins and Mr. J. M. Scott. The more we learn of the water system of this difficult country the more complicated and mysterious it becomes. We hope that a resolute attempt may be made to reconnoitre the great extent of inland water. A country over which Canada and Newfoundland spent a quarter of a million in law deserves a considerable sum for its survey.

Mr. Wordie's expedition to Greenland was a very successful example of those University Long Vacation exploits in the Arctic which have done so much since the war to train our younger generation of geographers. Difficult ice conditions delayed their approach to that inhospitable coast of East Greenland and left them little time for their work; but under the strong and experienced leadership of Mr. Wordie all their objects were accomplished.

The Great Barrier Reef Expedition returned last autumn after an arduous twelve months on the Reef. Some of their work was outside the scope of our interests, but the geographer, Mr. Spender, whom we were able to attach to the expedition, brought back so much detailed mapping and so many ingenious theories on reef building, that although he gave us his lecture in January, he has not yet been able to complete his paper for publication.

Very different was the field of the Oxford University Expedition in the tropical forests of British Guiana. Major Hingston gave us a charming account of this first reconnaissance into the tree canopy of the tropical forest. Here again the work was biological, but we were able to attach to the expedition a surveyor, who was able to do some useful work.

We await with interest the report on the geographical aspects of Mr. L. S. B. Leakey's long investigation of the lakes of Central Africa and Mr. Eldon Rutter's recent journey into Arabia.

All these expeditions and others I have no space to mention we have been able to help in a greater or less degree, and the Annual Report shows that for the first time for some years our total expenditure has reached the sum, large for us, though from many points of view, far too small, of £1000. Even this has only been possible by drawing upon our reserves in the Expedition Fund, which is now low. I commend it to the generous notice of our Fellows, for I must emphasize that the Society's share in exploration can be best maintained if this Expedition Fund can be augmented by gifts or legacies.

As for the future. I must mention one expedition which is shortly leaving England, of which we have high hopes. If there is to be an air route from this country to Western Canada and the Pacific it must go across that zone of Greenland which is least accessible on the East Coast and almost totally unknown inland. No serious organization can be undertaken until we know what mountain ranges may emerge from the interior ice-cap and what are the general conditions of the weather. Thanks, chiefly, to the munificence of private supporters, Mr. Watkins has been able to organize an expedition of twelve or fourteen men who will sail in the *Quest* for the East Coast of Greenland to work for two summer seasons and the intervening winter. The British Arctic Air Route expedition, so quietly and thoroughly prepared, is the most important British Arctic venture of recent years. It takes with it the particular good wishes of the Society, the best instruments we can furnish, and a little of our money. It has with it specialist officers of the British Army, Navy, and Air Force, and it has the cordial good-will of the Danish Government. I have sometimes thought that that Government must be a little worried by the presence of expeditions which get into difficulties, broadcast them by wireless, and expect the authorities to get them out. We have the best reason for confidence that Mr. Watkins and his companions will not prove themselves troublesome visitors in this respect. They take with them the good wishes of the whole Society and hearty confidence in their success.

At the Annual Meeting last year I was able to say that contracts for our new buildings had been placed, and those who passed the House of the Society were able to see that the north-eastern corner of our land was being cleared. To-day the site is occupied by a striking building which is approaching completion. Those of us who, like the Members of our Council, are very familiar with the designs and their concrete realization, feel that, in the course of a few months, the Society will possess a home worthy of its traditions and of its position in the geographical world. We are satisfied that the Society will have obtained excellent value for its money and that the buildings will materially benefit the Society and increase the efficiency of its administration.

In the name of the Council I beg to thank the 1500 subscribers to the building

fund; we are within sight of our goal, but have not yet quite reached it. To drop metaphor, we should like £1500 more, and then we should have obtained the sum which we set out to get. It would be very agreeable to the Council if we were to receive this relatively small sum before we begin our Centenary celebrations.

And, as regards the Centenary, the programme of the celebrations has been carefully thought out. They will take place on October 21, 22, and 23. We have heard with great regret that His Majesty the King will not be able to open the new buildings in person; but he has graciously promised to nominate a Royal Prince to represent him, and as soon as His Majesty's pleasure, in this respect, is known, a detailed programme will be issued.

Invitations to send delegates to the Centenary celebrations have been despatched to all the principal geographical societies and geographical institutions in the world. The acceptances already received assure us that we shall have a distinguished company of guests at these ceremonies.

Once in a hundred years the President of this great Society will be able to direct the attention of its Fellows to its position after a century, or in the future, after several centuries, of work for the "promotion and diffusion of that most important and entertaining branch of knowledge—geography." And, though we shall not formally celebrate our centenary until October next, this may perhaps be my best opportunity of placing on record the main facts about the organization and aspirations of the body to which we belong, in the hope that a hundred years from now, the President of the year 2030 A.D. may be able to make useful comparisons between his age and ours in the sphere of geography, particularly as regards the constitution and activities of the Royal Geographical Society.

Let us first lay a good foundation of statistics. There are at the present moment 6439 Fellows, and to that number we must add 12 Honorary Fellows, who are for the most part Royal Personages, and 47 Honorary Corresponding Members; all on the latter list are foreigners.

His Majesty the King is our Patron. His Royal Highness the Prince of Wales is our Vice-Patron. His Royal Highness the Duke of Connaught is our Honorary President.

The affairs of our Society are regulated by a Royal Charter dated the eighth day of February, in the twenty-second year of the reign of Queen Victoria, and by Byelaws which were last revised at a General Meeting held for the purpose on 3 June 1929. The government of the Society, and the management of all its concerns, are entrusted to the Council, subject to the provisions of the Charter and the Byelaws of the Society. The Council is 34 strong.

The Secretary of the Society is appointed by, and is responsible to, the Council; he carries out the instructions of the Council, conducts the correspondence that results from such instructions, is in general control of the routine administration, is the Editor of the *Geographical Journal*, and is on the spot to interview travellers returned from abroad, and has a great variety of important duties. I have been closely in touch with the late Sir John Keltie, the last Secretary, and with Mr. A. R. Hinks, our present distinguished Secretary, and I have never heard either of them complain that there was not enough to do.

The Society has been peculiarly fortunate in its Secretaries. Presidents come and go and Councils change, but there is, happily, a considerable degree of stability in the office of Secretary. Mr. Bates was Secretary for twenty-eight years, Sir John Keltie for twenty-three years, and Mr. Hinks has already been Secretary for fifteen years. During these last fifteen years we have had many interesting, and some troublesome, problems. The period includes the greater part of the War and the years of financial stress immediately following it. It takes some skill to carry out, under the Council, the daily administration of a society when the value of money diminishes in the proportion of 17 to 10, without resorting to any increase in the rate of subscription. In all such matters, in the many adjustments necessary in the affairs of a growing institution, in keeping abreast of the ever-increasing output of knowledge, in the advocacy of the use of new methods, in the steady encouragement of surveyors and explorers, in maintaining a high standard of accuracy, style, and form in our *Journal*, Mr. Hinks has most admirably carried out the policies of the Council, and has earned the gratitude of our six thousand Fellows.

Let me now deal briefly with finance. As will be seen in the Report of the Council, dated May 1930, our income is somewhat less than £22,000 a year, and by careful management we are enabled to carry a little—very little—forward. Practically, we spend our income and have nothing over to put by for a rainy day. More than that, we are obliged to practise certain vexatious economies. We should like to illustrate our *Journal* by more maps, but we cannot afford as many as we should like. We wish we could spend more money on financing, or helping to finance, exploring and other geographical expeditions. We sometimes, alas! have to resign ourselves to seeing valuable geographical books or maps come on the market and find a home elsewhere than on our shelves. And, as I have said, we are not able to invest any money. So much for the darker side of things. On the other side, we not only pay our way, but are gradually getting rid of a debt which was incurred when we originally went to Kensington Gore. We have as assets a most valuable freehold property and an unrivalled collection of geographical books and of maps. According to the last balance sheet our assets exceed our liabilities by £142,000. Our new building fund is doing well and we shall soon extinguish altogether the old building debt that I referred to above. Our numbers continue to increase, we are stronger as a Society than we ever were in the past, not only numerically, but financially, and we expect to still further strengthen our position after the opening of our new buildings. Our predecessors of eighty years ago would have envied us: they were then in financial low water. But we can say, with Sir Clements Markham, "The true foundation of the Society's success has been the close attention to its finances which has been given since 1850." And we may also say that one strong reason why the Society was able to overcome the difficulties of its early years and why it has, since the date mentioned, steadily improved its position, is that it has been fortunate in having as its Treasurers, first, almost a hundred years ago, Mr. John Biddulph, then Mr. Robert Biddulph, then Mr. Reginald Cocks, then Mr. Edward Cocks, and now, Lord Biddulph, who have all given the most devoted attention to the financial affairs of the Society.

The immense energy of Lord Curzon and the great success of his appeal for

funds, enabled the Society, in the year 1913, to buy our present House for £100,000. It was always Lord Curzon's view that the lower part of the garden, remote from the House, should be sold or let, and that, with the proceeds, a Lecture Hall should be built. The ground was disposed of in 1927, and a new appeal for more funds was launched. The Council soon found that they could safely proceed with the scheme, and the new buildings were begun on 17 June 1929; they are now, as we all know, approaching completion. With the completion of the new buildings the Society will find itself with a greatly improved home, without any debt (as we hope); but it will have got rid of its only disposable asset, the surplus ground. To replace this asset it will be desirable to create, perhaps by automatic payments, from its income, into a capital account, from year to year, a fund which will take the place of the property sold, as a reserve which will serve to further improve the financial position. A society such as ours must, in the course of its history, expect to pass through lean years as well as fat ones, and difficulties of this kind cannot always be immediately met by an increase in membership, though we may look forward to a steady increase as the years go by. The membership of the Society has, as a fact, increased by over twelve hundred during the last ten years, the largest increase, of nearly three hundred, occurring in the year 1922.

The daily work of the Society is carried out by a staff of twenty-three, including the Secretary, Assistant Editor, Miss Fea, Secretary's Clerk, Mr. Gardner; the Librarian, Assistant Librarian and Library Staff; the Instructor, who is also the Map Curator, the Assistant Map Curator and Staff; the Chief Clerk, Mr. Mobberly, and Staff. In the office over 20,000 incoming letters are dealt with each year. Some are, of course, just business letters; others open up a wider field of interest and conjecture. Such questions as, "What are the Seven Seas?" "How many continents are there?" are not uncommon. I believe that Atlantis is having a rest just now, however, and the sea serpent.

It is in the publication of the *Geographical Journal* that the Society gets most in touch with the main body of the Fellows. There were difficulties just after the War which were not, perhaps, realized by all who read the *Journal*. The price of paper soared from 3*d*. a pound to 1*s*. 6*d*. Now an increase of 1*s*. 3*d*. a pound on 20 tons of paper involves an additional charge of £2800. Fortunately the price of paper came down eventually, and it is now about 5*d*. a pound. Our *Journal* is one of the few periodical publications that did not alter its price as a result of the increased cost of paper and publishing. But we have had to walk carefully. We now find in the *Journal* rather more pages and illustrations than before the War, but fewer maps. Maps are now unreasonably, as some think, expensive to produce; but maps are essential for the proper study of many of our subjects, and we keep steadily in view the desirability of publishing as many maps in the *Journal* as we can afford and are really required.

Recently much attention has been paid to the appearance of the *Journal*, to the character of the type used and its spacing, to the titles, to the process blocks, and even to the advertisements, which have disappeared from the cover.

From a modest beginning in 1832 the Library has steadily grown by donations and purchase until it now contains some 75,000 volumes, and may certainly rank as one of the most complete geographical libraries in the world. Of the classes of books represented, works of travel and geography in the stricter

sense naturally take the foremost place; but a certain number of books on allied subjects, such as geology, climatology, ethnology, and history, also find a place. Serial publications, including official issues of Government departments, form a large section, which embraces the journals of all the geographical societies of importance at home and abroad, and a certain number of journals of a more general character, or such as deal with the sister sciences. The journals received in exchange number over three hundred. The wide outlook of the subject naturally gives a polyglot character to the collection. Practically every European language is represented, besides a few from other parts of the world, particularly Chinese and Japanese.

It is our aim to include in the Library every work of real geographical importance, whether British or foreign, and, though gaps still remain, a fair approach to completeness has been attained. Desiderata, for the record of which a special book is kept, are constantly being supplied so far as means permit. Hints from Fellows as to books which might with advantage be obtained are always welcomed and, if possible, acted upon. The enormous rise in the price of rarities, especially if dealing with America, makes these more and more difficult to secure, but their place, when the originals do not form part of the collection, is to some extent supplied by modern reprints. But these lack the authority and prestige of the original versions, and for the continued supply of the originals as they come on the market the Library must depend more and more on the generous gifts of its well-wishers, to which it already owes so much. Special mention should be made of the unrivalled collections of books on the Polar Regions, and on the East, acquired through the liberality of the late Colonel H. B. Feilden and the late Mr. A. P. H. Hotz respectively. An equally comprehensive collection of works on Morocco, made by the late Dr. Robert Brown, was purchased by the Library after his death. In the department of early atlases and works on general geography the Library owes much to the late Mr. Yates Thompson, the late Lord Peckover, and to Mr. W. A. Cadbury. Thanks to such gifts, supplemented by purchases, the Library possesses a thoroughly representative set of early editions of Ptolemy, the great Italian collection of Lafreri, and a fair collection of the great atlases of Mercator and Ortelius. The early collections of travels are also well represented.

Much importance is attached to the arrangement of the books on the shelves, which is by countries where possible. Open access to the shelves is permitted to Fellows. Just at present pressure on the available space interferes somewhat with a perfectly systematic arrangement, but any such difficulty will disappear when the new buildings are opened in October next.

The duties of the Library staff are very varied. First amongst these duties is the assistance given to Fellows using the Library, not only in obtaining the books required, but in giving advice as to where information may be found and in looking up authorities. Then there is the never-ceasing duty of cataloguing and indexing. Lists of new geographical works, and of articles in the various journals, are made and printed two or three times a year; these form the basis of the catalogues, and the entries involve the careful examination of all the works received. Then the indexes of the *Geographical Journal* are also prepared by the Library staff. In addition to these activities the staff necessarily spends a good deal of time in answering inquiries. Much of the information is wanted

for practical purposes or for research work; but sometimes it would appear that questions of a trivial character are propounded, sometimes even for the settlement of a bet! Other questions are due to a thirst for knowledge: "What is the earliest use of the name Polynesia?" "What is the deepest lake, the longest river?" "What were the Painter's Wife's Islands?" and so on. Inquiries as to the whereabouts of obscure places are very frequent, as are those concerned with the origin of place-names, and the value of old books or maps.

All those who have had occasion to consult the Library on any such matters or on others not enumerated—and the name of those who seek for such help is legion—meet with every possible assistance from Mr. Heawood, Mr. Crone, and their assistants. Mr. Heawood has been Librarian for nearly thirty years and has a profound knowledge of the literature of geography. Many a time I have asked him for information on geographical matters, and have always gone away impressed by the extent and accuracy of his knowledge. We are fortunate in our Library staff and especially in having Mr. Heawood at the head of it. It is pleasant to think that we shall shortly realize the aspiration of our late President, Dr. Hogarth, and shall have built a library building more worthy, than the present arrangement, of our valuable collections and of our Society.

Another very important department is the Map Room. The staff of this consists of the Map Curator, Mr. E. A. Reeves; the Assistant Map Curator, Mr. Allen; and two junior assistants. At the present time (May 1930) there are in the map collection about 184,000 sheets of maps and charts, 1700 atlases, 75,000 photographs, and 26,000 lantern slides. We may compare these numbers with those of fifty years ago, when there were only 35,000 sheets of maps and charts, and 500 atlases. A Government grant of £1250 a year is given to the Society, on the condition that the Map Room is open to the public; and this privilege is freely taken advantage of. In this respect the Society is definitely a public institution.

The map collection includes many important manuscript maps of early explorers, such as those of Moffat, Livingstone, Speke, Grant, Baker, Stanley, Gordon, and Thomson. It contains the only known copy of Hondius' large map of the World on Mercator's projection of 1608; a copy of Blaeu's large map of the World in hemispheres of 1655; many valuable old atlases and collections of rare maps, including twenty-four editions of Ptolemy, ten of Ortelius, and seven of Mercator. In the collection will also be found the Admiralty charts, the 6-inch and smaller scale sheets of the Ordnance Survey, the maps of the Survey of India, and of the survey departments of the Dominions and Colonies, which are presented by the departments concerned. In addition, all important foreign government official maps are obtained as far as possible.

The work of the staff consists of cataloguing the maps, atlases, photographs, and slides; attending to visitors; answering correspondents who write for information; and preparing lists of new maps for publication. No maps, atlases or original photographs may be lent to any one to take out of the building without the special permission of the President or of one of the Secretaries. But the lantern slides may be freely lent to Fellows and are in great demand for lecturing purposes—for a small fee. The Map Curator is also in immediate charge of the Map Drawing Department, in which five draughtsmen are employed. This department is responsible for the compilation of the maps

that are published by the Society in the *Geographical Journal* and of the map slides that are used to illustrate the papers read at the meetings. Much of his time is taken up with the selection of material to be used, the computation of the astronomical observations of travellers, and plotting from their field-books. Mr. Reeves is also the Survey Instructor, so that much of the routine work of the Map Room necessarily falls on Mr. Allen. I am sure that all who have had occasion to consult the Map Room of the Society, members of the general public as well as Fellows, will agree with me that it is admirably organized.

The praise of the Survey instruction of the Society is in the mouths of all travellers. This department of the activities of the Society owes its origin to Sir Clements Markham, then one of the Honorary Secretaries. At his instigation the Council in 1879 instituted a regular course of instruction in surveying and field astronomy, and Mr. John Coles was appointed Instructor. Mr. Coles resigned in 1900, and in 1902 Mr. Reeves became Instructor as well as Map Curator. When first established the instruction was largely based on the sextant, suitable enough for the exploratory methods then in use. But after 1902 the need of greater precision became evident, especially in the use of triangulation and of plane-tabling, where possible, in place of sextant work and compass traverses. This change synchronized with a change in the methods used in the exploratory land surveys of the Empire—a change largely due to the example of the Survey of India; and now the Survey School at Chatham, the Colonial Survey Committee and the Society's School of Survey Instruction march hand in hand, to the great advantage of British exploration.

During the past half-century more than one thousand travellers and explorers have received instruction, and in addition some nine hundred political and other officers from British Tropical Africa and elsewhere have attended special courses in surveying and mapping. As mentioned above, the character of the instruction has changed during this period. The micrometer theodolite has almost entirely taken the place of the sextant. "Absolute" methods of finding the longitude have given place to the determination by wireless signals. For certain purposes the prismatic astrolabe, and the prismatic astrolabe attachment to a theodolite (the latter the invention of Mr. Reeves), have proved their value. And photo-surveying has made rapid strides. The Council of the Society is alive to the necessity of keeping pace with modern methods, including surveying from the air. The changes in technique in recent years have been so numerous that the Society's admirable hand-book, 'Hints to Travellers,' now needs thorough revision, and this will shortly be carried out.

The Society grants a Diploma in Surveying which is recognized by the Colonial Office. This Diploma is not granted lightly, and during the last fifty years only eighty men have obtained it.

The value of Mr. Reeves's work is recognized not only in this country, but also abroad. The American Geographical Society awarded to Mr. Reeves the Cullum Gold Medal for his successful methods of instruction and for his inventions. And our own Society followed suit in 1928 and gave him the Victoria Research Medal.

From the nature of the case the Society has always taken an interest in the spelling of place-names, and, in 1878, propounded the general principle that in writing native geographical names vowels should have their Italian sound

and consonants should be sounded as in English. A system based on this principle was established and called the R.G.S. System. But this was little more than a framework and the application of the rule was not always certain. So in 1919 the Admiralty suggested that the Society should form a permanent committee to deal with the transliteration of foreign place-names, and a committee was formed, with Lord Edward Gleichen as Chairman and Mr. J. H. Reynolds as Secretary. The full title of the committee is "The Permanent Committee on Geographical Names for British Official Use." The various Government departments interested are represented on the committee with representatives of the Society and of the Royal Scottish Geographical Society. The P.C.G.N. has its headquarters at the Society's House, and its publications are advertised in the list of our own publications. For three years the Committee received an annual grant of £250 from Government, but in the year 1922 this grant ceased, and financially the P.C.G.N. lives now rather from hand to mouth, being mainly supported by a few institutions, societies, and firms interested.

The first work of the Committee was to revise the R.G.S. System and to issue the rules known as the R.G.S. II System. These rules have been adopted with slight modifications by the Geographic Board of the United States, and by many other boards and surveys. This system has been the basis of all the subsequent work of the Committee, its main business now being the publication of lists of foreign place-names, in pamphlets sold to the public at the uniform price of sixpence. Thirty such pamphlets have already been issued. All this work is of real practical value and the recommendations of the Committee obtain general acceptance in English-speaking countries.

And now for a few words about our meetings. We have, as a rule, about fifteen evening meetings and seven afternoon meetings during each session. The evening meetings are usually devoted to descriptions and discussions of travels and explorations; the afternoon meetings are generally occupied with the more technical aspects of geography. Reports of both classes of meetings are printed in the *Geographical Journal* and form its main substance. The evening meetings have, for twelve years, been held in the Aeolian Hall, in Bond Street. That Hall will hold about 490 people, and, with a popular subject on the programme, the Hall is filled. The average evening attendance may be taken as about 350 or so. Some forty years ago, with many searchings of heart, lantern pictures were introduced; now it is hard to imagine a lecture taking place without them. One result of using lantern slides is that lantern-slide maps are used in place of the old wall maps, so troublesome to make, and so ineffective when made. Also lantern-slide maps make it unnecessary to distribute hand maps, which always resulted in a disturbing rustling during the lecture. There was one pleasant feature of the evening meetings when they were held in the old theatre of Burlington House up to twelve years ago, and that was that, after the meetings, the Fellows and their guests adjourned to adjoining rooms and talked and had tea and coffee. It is intended to revive this excellent custom when we begin to use our new Lecture Hall at the end of this year.

Our afternoon meetings deal with a great variety of subjects, some of them too scientific to appeal to a general audience, but all of interest and value to the student. Such matters as the alleged desiccation of Central Asia, the use of

stereoscopic photography in mapping, the nomenclature of the Western Himalayas, hydro-electric power development in New Zealand, have been recently discussed and give an idea of the large range of matters dealt with.

And now, having considered briefly our material state as a Society, our numbers, our possessions, our income and our organization, let us consider for a moment what is the purpose of all this apparatus and of all our efforts. The Society, in words approved by the Raleigh Club on 24 May 1830, has as its object "the promotion and diffusion of that most important and entertaining branch of knowledge—geography." In the Royal Charter this Society is established, "by the name of The Royal Geographical Society, for the advancement of Geographical Science." In dictionaries it will be found that Geography is defined as A Description of the Earth. None of this carries us much farther. What are our aims, and what are we actually doing?

Well, it is quite certain that the very foundation of all our work is the exploration of this world's surface and the expression of the results of this exploration in maps. The duty of encouraging explorations and surveys is always before our Society, and we have never, in our hundred years' history, failed to advance this fundamental task of the geographer. One has only to turn to any issue of our *Journal* to see how much of our energy is rightly spent on helping travellers, explorers and surveyors, and in publishing their results.

Our second most important task, as it seems to me, and as has recently been emphasized by our Council, is the Study of the Earth as the Home of Man. That is, the study of man's reaction to his environment, and also the effect on his environment of man's occupation. The Council of our Society is anxious to encourage genuinely scientific work on subjects coming under this heading of Human Geography, as it is sometimes called. But the contributions that the Council desires to encourage are such as are not very often available for publication; there is a certain dearth of good papers on all aspects of human geography, though there can be no doubt about the importance of the subject. To take only one aspect of it: What is going to happen to the continually increasing population of nearly every country in the world? Where will the surplus be accommodated? How will food and work be found for the new myriads? What lands are suitable for development, and what lands are not? Is it the case that parts of the Earth are less suitable for living in now than in the past? At what rates, as a fact, are the various populations increasing? And what about migration? And what happens to a race transplanted to new surroundings? And so on and so on. Now, some of these problems can be dealt with, in the first instance, by the statisticians, but not all; many are border-land questions that involve the co-operation of students in different branches of learning. And here we come to a most valuable function of geography and of geographical societies. Geography is a meeting-ground for the discussion of a great variety of aspects of Earth-Knowledge, taking the term in a wide sense. The experts in geology, in meteorology, in climatology, in oceanography, in sociology, in ethnography and anthropology, and even the statisticians and the biologists, are all, in part, geographers; none of them can get away from the terrestrial environment; by none can the geographical factors be safely ignored. The rigid compartments of science are being broken down; wider views and more comprehensive are the order of the day. And we serve a useful scientific

function if, as well as adding our own peculiar contributions to the common stock of knowledge, we treat geography as a "bridge subject," thereby enabling experts in other sciences to meet on common ground, to broaden their views, and to take due account of the geographical realities of the wonderful world on which we live.

This is the last occasion on which a President will address the Royal Geographical Society from this concert platform. We look forward to the use of our new Hall, which has been specially planned for our needs; a Hall which will enable us to entertain a larger audience in greater confort; in the design of which great attention has been paid to visibility and audibility; in which Lecturers and Speakers will not be separated from their audience by a cliff-like barrier. But we should be very ungrateful—and I am sure that we are not that—if we did not express our thanks to the Manager and Staff of the Aeolian Hall for their courtesy and attention during the years that we have been their tenants.

THE COLOUR OF RUWENZORI: *A paper read at the Evening Meeting of the Society on 18 December 1929, by*

CARVETH WELLS

ONE of the finest descriptions of the scenery on Ruwenzori was given before the Society by Mr. Douglas Freshfield during the discussion of Captain Humphreys' paper in 1927 (*Geogr. Jour.*, vol. 69, pp. 516–531), from which the following passage has been extracted:

> "That enchanted forest has a weird and grotesque effect that is all its own. In the mists and gloom of the frequent rainstorms it may suggest a nightmare caused by studying the illustrations of Paleolithic vegetation in some text-book. In the rare sunshine one may fancy oneself enveloped in the scenery of a Russian pantomime. The open glades bristle with the upright stalks of lobelias, green obelisks 12 feet high, like tombstones in a Turkish cemetery. They are mixed with senecios, writhing stems, crowned by mops of spikey leaves, fit for a witch's broom. High up a white everlasting Helichrysum covers acres with its sheet of silver or golden blossoms. On the precipitous slopes and ledges tree heaths drip with the perpetual moisture. Gaunt and grey, draped in preposterous masses of moss and lichen, they look like the vegetable ghosts of a departed world."

Immediately I read it, I realized that, like all descriptions of scenery, it needed colour to complete it. Any one who has seen the magnificent photographs taken by Vittorio Sella, which illustrate Filippo de Filippi's famous book, 'Ruwenzori,' cannot but regret that upon such an important expedition apparently no steps were taken to record the colour of such extraordinary scenery.

Through the generosity of Mr. B. A. Massee, a Fellow of this Society, funds were placed at my disposal for this purpose, and the "Massee Ruwenzori Expedition" was organized. Its object was to follow as far as possible in the footsteps of the Abruzzi Expedition, and secure a record of the colour on Ruwenzori. The Geographical Society of Chicago gave its auspices to the expedition, and the Milwaukee Public Museum appointed Mr. Osborn Goodrich to accompany me as its representative.

The question of what process should be used to secure the colour effects was fully discussed before leaving America, and it was generally admitted that colour notes scientifically taken on the spot and afterwards translated by painting the slide gave results still far superior to any process of so-called "natural colour" photography.

The reason for this was that in all the processes of "natural colour" photography, the colour could be largely controlled by the process of development. That is to say, that whilst a photograph of a green cabbage might look accurate on the screen, there was no guarantee that the green was of the correct shade. A photograph of a red rose, for instance, can be so developed as to produce several different shades of red quite different from that of the original rose.

The system we adopted was as follows: Immediately a photograph was taken, very careful and full notes were made, both by description and by actually matching as many colours as possible, with a colour book. These colour books look very much like an illustrated catalogue of a paint dealer. The pages are

divided into small coloured squares and every imaginable shade of colour is shown and distinctly numbered. Sometimes the colour notes for one photograph alone would run to several hundred words. In this way, coloured slides can be made that in no way resemble the old-fashioned coloured slides, in which the sky was always blue, the trees always green, and the earth always brown.

One of the great problems for the photographer is the prevalence of bright yellows and browns, both of which photograph black, and therefore render it extremely difficult to make accurately coloured slides. This difficulty was overcome by retouching the negatives before making the slides, carefully painting red the areas which would print black on the slides.

In ordinary circumstances, the use of panchromatic plates and large cameras, would, of course, have simplified considerably the problem of photographing reds and yellows, but there was the question of weight to be considered as well as the possibility of having all our panchromatic negatives spoilt by improper handling. From the experience gained on this expedition, however, it would be a simple matter to do the work again under more comfortable conditions, using more elaborate photographic equipment. In fact, ours might be described as a preliminary photographic survey, to determine the best way of securing the most perfect photographs on some future expedition. In some instances, instead of retouching the negatives, full-plate enlargements were made from the original negatives. The reds and yellows of course printed black on the enlargement. These areas were then carefully painted out with chinese white or pale blue, and a new negative made by photographing the retouched enlargement. Slides were then made from the new negative.

All the still photographs were taken with an Ica camera, quarter-plate size, fitted with an F 4.5 Zeiss Tessar lens and a Compur shutter. Five thousand feet of motion pictures were also taken, using panchromatic film and a Devry portable camera, taking 100 feet of standard gauge film at one loading.

Only those who have experienced the damp discomfort, misery, and cold of life on Ruwenzori can appreciate the difficulty of taking any photographs at all, especially with a kinematograph. The constant loading and unloading of the cameras and the setting up of the tripods were one long suffering, and it is true to say that, although our chief object was to secure photographs, we often hated the sight of a camera.

We left Nairobi on 6 August 1928, in a 1-ton Chevrolet truck, and for six days we rode into the interior along some of the worst roads ever made by man, all of them made worse by an almost steady downpour, arriving at Fort Portal on the 12th. After sleeping in ditches, hauling the car out of axle-deep mud, and freezing and sweltering by turns as we zigzagged across the Equator in Kenya, we were delighted to find, in Uganda, that most up-to-date hotel, the "Mountains of the Moon." The Ruwenzori range can be seen from the hotel, but only at very rare intervals, and then usually by moonlight. When we arrived there was a great bank of grey clouds that completely hid from view any sign of the most important range of mountains in Africa. Towards sunset, however, the most northerly part of the range became visible for a few moments.

In Fort Portal I was fortunate to secure the services of Mr. George Oliver, who had accompanied Captain Humphreys on his expedition. Mr. Oliver has had considerable experience of Ruwenzori and speaks the language of the

Bakonju who live at the base of the mountains, and without whose assistance as porters it is impossible to ascend. Oliver proceeded alone to Ibanda to recruit porters, and two days afterwards, on August 15, Goodrich and I followed with our two personal boys.

There is a good road from Fort Portal to Kasunganyanza, which is 32 miles away, and the nearest place to the foothills of Ruwenzori.

The Ruimi was in flood and too deep to cross at the usual ford: about 50 feet wide and very swift. By going upstream about 100 yards we were able to cross to a small island and then to the other side, getting wet only to the knees; but that wetting lasted us for the next three weeks. The heat was terrific, and for

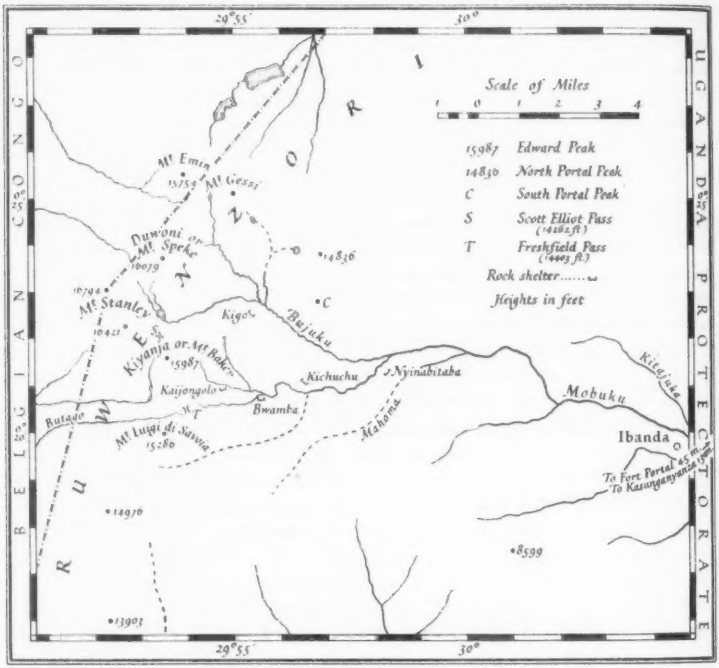


Diagram of the Ruwenzori peaks

miles we walked through elephant grass that closed in overhead like a tunnel and swept across our faces continually.

Through more tunnels and through groves of black-trunked banana trees (used for making beer) we reached the first tributary of the Mobuku, a small stream running through a rocky gully and crossed by a log bridge about 10 feet long. The main stream of the river was reached later in the afternoon.

Twenty-two years ago the Duke's safari had stretched a rope across the river, and crossed by hanging on to it. The rushing mountain torrent about 60 feet wide was, fortunately for us, not in flood, and our porters waded across,

Nyinabitaba camp (8800 feet)

Mount Baker from Kaijongolo camp

but Goodrich and I were carried on the shoulders of a little man as strong as an ox.

After another mile and a half we found our tent pitched in a clearing very much like the one at Kasunganyanza, the door facing up the Mobuku valley, and at last we were really in the foothills of Ruwenzori. Within a few minutes of our arrival, along came the conventional tokens of welcome in the form of some chickens, eggs, and a bottle of milk, followed by an official visit from the local chief.

The great problem on Ruwenzori is the food supply for the Bakonju. Game is altogether unobtainable on the mountain, and as the range is uninhabited it is impossible to secure any food on the march. Salt is of the greatest importance to these Bakonju; they eat it in considerably larger quantities than we do sugar, in the form of transparent cubical crystals about the size of a pea. Altogether we were able to buy 70 pounds of this salt, for which we paid about ten shillings; 1200 pounds of millet flour for £3 10*s*; one live ram for £2, and a goat for £1.

We were fortunate in finding four Bakonju who had accompanied the Duke of the Abruzzi in 1906. One of them, named Bamwanjala, had also accompanied Captain Humphreys, and he agreed to be our guide. The other three were very old men, and regretted that their legs would no longer carry them, but the oldest consented to deliver a lecture to the rest of the Bakonju and explain to them the nature of the snow.

The Bakonju wore practically nothing except a piece of bark cloth around the loins, but each man carried his purse slung round his neck. This was simply the complete skin of some small animal about the size of a cat. The skin had been removed from the animal by pulling it over its head, so that it formed a bag. The two hind legs were joined together, making a loop which went over the porter's head, and the bag hung down his back. No two skins seemed to be alike; they were of various colours and markings. A Bakonjo would be absolutely lost without his purse, in which he carries all his treasures, especially his pipe and tobacco. In addition to the purse, each man carried a fire-bundle and a peculiar musical instrument, which he could use either for entertaining himself or for signalling.

The fire bundle was most interesting. Three feet long, and about 4 inches in diameter, it normally showed no signs of fire, but looked like an enormous cigar made of banana leaves. A loop was attached to the bundle, which was worn over the shoulder. Inside this bundle was a lot of tinder and dry grass, which was ignited before the bundle was tied up. In order to make a fire, one end of the bundle was opened, whereupon the contents immediately burst into flames. Fire can be carried in this way, in all weathers, for as long as a month.

The start from Ibanda was made in a terrific thunderstorm, about eleven o'clock on August 18. There was some delay until we agreed to employ the services of a Bakonjo witch-doctor, who agreed to control the weather and make the sun shine. This he accomplished by playing upon a flute.

Looking up the Mobuku valley towards Portal Peaks the mountains were greyish-blue. There was no real blue sky, but grey clouds with yellowish sky in between. The sides of the valley were clothed with green vegetation, but in some places, showing very conspicuously, were brown patches of cultivation. Here and there dotted about the valley were erithryna trees covered with scarlet blossoms.

Mount Baker from Kajongolo camp

About two o'clock the expedition reached the Duke's old camp at Mihunga, where the night was spent. Every day since leaving Fort Portal we had experienced heavy thunderstorms, which occur almost daily all the year round. But next morning was beautifully sunny, and having sent our porters on ahead, we started to climb to the top of the ridge about 500 feet above Mihunga, hanging on to vines and clinging to rocks, following a tiny trail not more than a foot wide. The top of the ridge was covered with forest and lovely ferns. Great white clouds were rolling up the valley towards us, and the peaks of the mountains were shrouded with mist. Dense green forest covered the ridge above Mihunga, but here and there was a suspicion of autumnal colours. The boulders in the Mahoma river were covered with bright green moss, and the water itself, while clear and sparkling, was yellowish. Here and there, hanging from the limbs of the taller trees, were bundles of purple flowers. At 6700 feet there were plenty of tall ferns, 8 to 10 feet high, dark green, while the tree-trunks were covered with grey and green moss in which were growing orchids and small ferns. At 7300 feet we saw a huge rock covered with small violet flowers that had every appearance of ordinary violets, except that they were growing on a small creeper. At this elevation we came to the first bamboo—an isolated clump.

After crossing the rivers Chowa and Mahoma, we started to climb 2000 feet to our next camp, Nyinabitaba, which in Filippi's book is called Nakitawa. At one o'clock it began to rain, but the witch-doctor got into action and out came the sun again. Now began a strenuous scramble up the very steep razor-back ridge which runs up to Camp Nyinabitaba. On both sides of the path there was a steep precipice, and in many places the path was less than a foot wide, with a dizzy drop on both sides; but there was plenty of grass and trees on both sides as well, so that unless one took the trouble to look, one was not unduly conscious of the two precipices. On our right, hundreds of feet below, was the Mobuku, roaring down like thunder. The climb continued to get steeper and steeper, and the path narrower and narrower, until we seemed to be walking along the ridge of a roof with almost vertical sides.

Arriving at Camp Nyinabitaba in the middle of the afternoon, we found our cook, the chickens, and about ten of our porters huddled together under the overhanging ledge of a huge rock. They all looked as if the end of the world were approaching, especially the wretched chickens. A few yards beyond the boulder there was a small open space which had been cleared by the Duke's party in order to make room for tents. The space measured about 50 feet long and twenty wide, with steep slopes on both sides, right and left, and with the razor-back continuing up and beyond. The porters, who had arrived some time before us, had collected a good supply of dry wood and started a large fire in front of the tents. The sheep and goat were quite at home, and were grazing contentedly, but the chickens had given up hope, and were standing about with their feathers drooping on the ground.

Here, except for one solitary bird, there seemed to be no wild life. No insects humming, no ants, no woodpeckers, no distant call of the argus pheasant: nothing but the roar of waterfalls and the drip, drip, drip of moisture from the trees.

At four o'clock the porters gathered round to receive their rations of salt and millet flour. Some of them immediately placed lumps of salt in their mouths

Cloud among the groundsel and lobelias at about 12,000 feet on the road to Freshfield Col

UNIV. OF MICH.

Giant lobelias, senecios, and everlasting flowers in the heath forest of Ruwenzori

and ate it greedily like candy. They mixed flour with hot water and made a dough. Then they took a handful of dough, rolled it into a ball, stuck one finger into the dough, filled the hole with salt, closed up the hole and popped the ball into their mouths.

We had reached an elevation of about 9000 feet, and the temperature was 55° F.; but already the men clamoured for more clothes, and we began to wonder what would happen when it began to freeze every night. Before leaving Ibanda each porter had been given a blanket; but no warm clothes or boots were given out, for only those porters who consented to go up on the snows were to be allowed these luxuries. We promised, however, that those volunteers who were chosen to accompany us across the Scott Elliot Pass should be provided with boots, sweaters, stockings, fleece-lined woollen underwear, and an extra blanket apiece. Finding that the warm clothes were not forthcoming so early in the ascent, the men called upon the witch-doctor to warm up the atmosphere, which he proceeded to do by blowing long blasts on his flute. Towards sundown the weather cleared, and we were in good spirits. By six it was dark, and the moon came out, the temperature dropping to 48° F.

On August 20 we left Nyinabitaba after breakfast and continued climbing up the ridge. The trees gradually became greyer and greyer, due to the increasing quantities of grey moss and lichens. At 8.30 we reached a summit and then descended sharply, clinging to branches by hands, feet, and eyebrows, slipping and stumbling until we reached the Bujuku. For the next two hours the trail led across a large swamp filled with dead trees and large boulders. Every now and then I would stumble into deep black slime from which it took all my strength to extricate myself, but our porters scrambled from log to boulder like cats, all the while balancing on their heads their 60-pound loads.

At 10.30 a.m. we came again to the Mobuku, about 80 feet wide, 3 or 4 feet deep, and full of boulders. Both banks of the Mobuku at 9350 feet were covered with violets and white everlastings, while the slopes of the valley were covered with a forest of bamboo which, instead of being bright green, was covered with grey mosses and lichen.

At 2 p.m. we arrived at a huge precipice of mica schist, stratified at an angle of about 60 degrees. The precipice was overhanging a narrow ledge and from the top of the precipice water was dripping continuously, like a veil of silver. The overhang of the precipice was sufficient to cause the water to fall clear of the ledge, which was therefore quite dry, and provided just enough room for the tent. This was the famous Kichuchu Camp of the Duke at 9830 feet.

At a quarter to five a thunderstorm commenced. The heavy rain gradually changed to hail, but thanks to the overhanging precipice our tent remained dry. The goat and the sheep, tethered beside the fire, kept turning around, warming up one side and then the other. They were no longer interested in food but in trying to dry out. As for our poor chickens, only two were left, and they kept trying to enter the tent and go to roost for the night. The temperature was 40° F. when I crept into my sleeping-bag.

Next morning the rain had stopped, but everything was sodden, damp, and dripping. Clouds were rolling up the valley like big balloons on their way to the summits. The temperature had risen two degrees, but the sheep and goat were still warming themselves before the fire. The goat had apparently caught cold,

Giant lobelias, senecios, and everlasting flowers in the heath forest of Ruwenzori

and was sneezing and thrusting his head as far over the fire as he could without burning his hoofs. Neither beast had to be tied up any more: they knew the fire. The two remaining chickens were actually perched upon the ends of logs in the fire, and had small flames all around them and beneath them !

The rain soon started again, but after a few blasts on the witch-doctor's flute the sun showed signs of coming out, and at 9.15 we started off again. By 10.30 we reached a ledge with masses of pink ground orchids and banks of violets. About eleven we reached a great level valley above Kichuchu and came to a kind of weird fairyland in which absolute stillness prevailed. The Heath trees were covered with masses of golden brown, green, grey and pink moss, like huge feather pillows wrapped around the tree-trunks. The various colours seemed to blend into a warm reddish-brown tint. Sticking up here and there, "like tombstones in a Turkish cemetery," as Mr. Freshfield so aptly describes them, were giant lobelias of vivid metallic green—so vivid as to appear almost ugly. The leaves of the giant groundsel trees were also of the same harsh vivid green, which is so commonly seen upon cheap slides which have been badly coloured. In fact, when my slides were finally coloured, the colorist drew my attention to the fact that I had ordered her to use a green which I had before absolutely forbidden.

Perhaps the most exhausting and dangerous part of the journey up Ruwenzori is the crossing of the Fallen Forest, on the way to Bwamba Camp. For several miles there is a huge tangle of fallen tree-trunks, probably hundreds of years old, covered with bright green moss and very slippery. The slightest slip and we might have plunged down into darkness, to be impaled on a spike 3 feet long. Progress was slow and terribly fatiguing. Every now and then we would find ourselves on the very brink of a precipice hundreds of feet deep, with a slippery path only a few inches wide, along which our men scrambled with their heavy loads balanced on their heads. Then quite suddenly we emerged into the second level valley through which the Mobuku flows. On and on we plunged and splashed and slid and fell, until half a mile ahead of us, shooting horizontally out of the side of the mountain as if from some giant gargoyle, we saw a waterfall. This was Camp Bwamba, mentioned by the Duke. At Kichuchu the rain had dripped in a silvery curtain just beyond our tent, but in this case a great waterfall shot clean over it.

The colour of the scenery around Bwamba Falls was very striking. Large patches of golden and green moss mottled the precipitous sides of the valley; sometimes, high up on the face of the bare grey rock, could be seen an enormous slab of green moss as large as a tennis court. All the boulders were completely covered with a vari-coloured blanket of moss, while the water itself was a clear brown. Growing from the great carpet of grey everlasting flowers were vivid green groundsel trees, their trunks bundled about with great knobs of golden yellow moss.

The temperature that night dropped nearly to freezing, but I slept comfortably with a hot-water bottle at my feet. The next morning, in spite of the witch-doctor's efforts, there was a heavy rain falling when we left Bwamba and started for Kaijongolo. At midday, with the sun directly overhead, we were tramping through deep snow, but surrounded by "tropical" vegetation 50 feet high. By one o'clock we reached Kaijongolo, and found several of the wooden platforms

which had been erected by the Abruzzi party in 1906 still standing. The structures were covered with masses of golden and green moss.

When the Duke arrived here at Kaijongolo, he at first thought that such a place would be impossible for a camp, but by cutting down trees and rolling away rocks, and by building platforms (the remains of which we had found still standing) he managed to establish a camp; but even so, it is stated in 'Ruwenzori,' "By no effort was it possible so to transform this inconvenient spot as to create an even tolerable camp." We ourselves were indeed miserable, cold, and shivering, but the condition of our wretched porters can better be imagined than described.

The temperature at 4 o'clock in the afternoon was only 6 degrees above freezing and the rain poured steadily down. The great cliff of rock which overhung the ledge upon which we were perched was not dry, as it was in Bwamba, but water continually dripped on us, making it almost impossible to start a fire. There was not sufficient room to pitch our tent properly, so we took the fly off the tent and by tying the ropes to the rocks, we managed to erect a shelter large enough to contain our three beds. For warmth we kept two hurricane lamps burning, but their heat left much to the imagination.

As soon as we had fixed up the shelter, we changed from our sodden clothes into ones that were merely damp, and had a hot meal. Bamwamjala was then told that the time had come to select the twenty men who were willing to accompany us above the snow-line. The men were all assembled and the plans explained to them. Those who did not come with us were to retrace their steps down the mountain and return up the Bujuku valley with food and firewood, there to meet us when we descended. The prospect of being immediately supplied with outfits of warm clothing caused the whole lot to volunteer for the snows. So we picked out the men whose feet were in the best condition, and handed each a fleece-lined vest, a woollen sweater, a pair of thick woollen stockings, a pair of trousers, and a pair of heavy boots or canvas shoes (whichever he preferred).

Trying on the boots was a ceremony that took quite three hours to complete; but after much grunting, roars of laughter, and slitting open the sides of the shoes to make room for their little toes, they were ready to don their new garments.

Off came the filthy rags: animal skins, bark cloth, pieces of ancient blankets, dilapidated vests that some missionary had given them twenty years before. Each strange garment was carefully inspected, then arms were thrust through trouser legs and legs through arms, while the stockings remained an absolute mystery. Eventually, having all got dressed, they immediately put on all their old rags outside the new.

The temperature was just below freezing, and as our goat and sheep showed signs of dying voluntarily, they were slaughtered. It froze hard that night, and when the morning of August 23 dawned there was a dense fog. Everything and everybody was cold, damp and clammy, but I heard the song of a bird and found several spiders among my clothes, showing that there was evidently *some* life. It was decided to establish a camp at Freshfield Col, so, leaving a couple of porters behind to start a fire, our party set out.

As we climbed from Kaijongolo the groundsel trees became smaller and

fewer, but the everlasting flowers seemed to flourish in the deep snow. The porters had been sent on ahead, but by ten o'clock we caught up to them and found them huddled round a dead groundsel tree which they had ignited. It was pouring out volumes of smoke but no heat! Their loads had been dumped in the slush. In spite of their misery and the fact that their feet must have been simply frozen, they bucked up as soon as they saw us and were soon on their way. They had never seen snow before, and at first they carefully avoided touching it; but very soon it covered the ground and they were forced to walk through it in their bare feet; the boots we had supplied evidently hurt, for they removed them and strung them round their necks and wore their stockings on their arms!

At midday, after a most exhausting climb, we reached Freshfield Col Camp at 13,930 feet, where we found 6 inches of freshly fallen snow upon the ground. Under the snow was deep moss, and under the moss were several feet of thick sticky black mud. Every now and then one of the men would sink up to his waist in icy mire, from which it took the efforts of several men to extricate him. We were right out in the open, on the summit of a pass, and surrounded by jagged snow-capped peaks. The only shelter to be seen was a large boulder with everlastings growing on the top, and one large groundsel tree in front. Somehow we managed to pitch the tent on the lee side of the boulder. The floor of the tent was deep icy slush. The porters seemed to collapse, so we started both our stoves, filled a kettle with snow and served hot coffee all round, standing ankle-deep in freezing mud. It was out of the question for the porters to remain—they would have died before morning—so after giving them more hot coffee and an extra shilling apiece, we sent them back to Kaijongolo to sleep.

In the afternoon dense fog descended upon us, but I had brought with me a good supply of red cloth, which I then tore into pieces about 18 inches square. This done, we started out into the fog, leaving pieces of cloth on prominent rocks and taking frequent bearings with a prismatic compass, thus ensuring our being able to find our way back even if the fog did not lift. The higher we climbed the worse became the weather, until finally at 14,150 feet we halted. All about us was snow about a foot deep, and an icy wind blew the fog past us in long wraiths. Here we waited until 4.30 hoping for a clear sight ahead. On the surface of the snow were crawling spiders and minute flies, upon which I presume they fed, while fluttering about were small brownish-grey moths, some of which I collected. They kept alighting on the snow, and evidently found something to eat. I have since heard from the British Museum that the moths are a new species. Eventually we returned to camp, and the next day after a night of misery we made another attempt on Mount Baker.

All three of us felt the effects of the altitude more or less. Every few minutes we had to take a deep breath to relieve the feeling of suffocation. I had a splitting headache for several days, and a severe pain in the neck.

By four o'clock in the afternoon, having reached the foot of a huge glacier, a heavy snowstorm started, with amazing suddenness, accompanied by tremendous crashes of thunder, and vivid flashes of lightning.

Oliver led, I was roped in the middle, and Goodrich brought up the rear.

Cutting steps at an altitude of 15,000 feet is exhausting, but this was not our

Giant groundsel on Kitandara ledge (14,000 feet)

Elena glacier south of Scott Elliot pass

only trouble. None of us was provided with the proper kind of warm and waterproof gloves: in consequence, our hands, which had been cold and wet before we started, not only became numb with cold but also gave great pain as well. The snow was melting, and soon our boots were filled with ice-cold water. It was rapidly growing dark when we abandoned our second attempt to reach the summit, and returned to our ice-cold tent, pitched in black slush.

Our food supply was rapidly diminishing, and it seemed essential to move the main camp and get the porters up from Kaijongolo and over the Freshfield Pass. But Mount Baker was still beckoning, so it was decided to move camp, and at the same time try once more. Word was therefore sent down to the porters, and at nine o'clock on August 26 twenty-four men arrived. The remainder descended the mountain to Ibanda, where they were to get fresh supplies and ascend the Bujuku valley to meet us. Presently Goodrich and Oliver set out for the peak, while I started off with the rest of the men and equipment to cross the pass. By about 11 o'clock Goodrich and Oliver reached the lower of the two peaks on Mount Baker, locally known as the Tourist's Peak. Here a stone cairn was found, inside of which was a tin containing some frozen paper and a number of names. The weather was perfect, but soon after reaching the top a dense fog descended.

Edward Peak was reached at 2 p.m., and on the summit was a cairn, and inside it was a rusty tin can containing a plain white visiting card, undated, with the name Duca degli Abruzzi, and a piece of paper with the names G. N. Humphreys, Geo. Oliver, 28/7/26. These records, with our own, were carefully wrapped in tinfoil and sealed in a glass jar. This was replaced in the cairn and covered with a large piece of red bunting. By seven o'clock that night we were all encamped beside a charming lake in the valley, leading directly to the Scott Elliot Pass.

The view looking north up the valley towards the Scott Elliot Pass was magnificent. The two small lakes were quite calm and reflected the clear blue sky perfectly. Around the lakes was a forest of groundsel and lobelias, while flitting about from one lobelia to another were many gorgeously coloured birds. They had the long curved beaks of the honey-eaters, and had brilliant green and black plumage with a small patch on each wing that looked like a glittering sovereign. Both sides of the valley showed rich autumnal colouring, while above the vegetation the precipices looked as if they had been daubed by some giant paint-brush with green and yellow paint. Glistening glaciers came down on each side of the valley, while volumes of heavy white vapour flowed down from the high summits.

On August 27 we began the final ascent to the Scott Elliot Pass. There was no trail for the porters, so we led the way with Bamwanjala, cutting down giant weeds, walking across the fallen stems of gigantic birdseed, and scrambling over boulders. Soon my heart was pounding like a sledge-hammer, and I was not at all sorry when the porters announced that they could go no farther that day. Ahead of us was a great ridge of rocky peaks like an enormous row of teeth: our route led over the very top. We found a camp site, Kitandara, high up on the side of the precipice: a ledge only 4 feet wide, but partly sheltered from avalanches by the precipice above; and for two days we existed on that ledge. Our food supply was very low. Between us and comparative safety was that

range of saw-toothed peaks. Over them lay the Bujuku valley, where our relieving porters were to be with fresh supplies and firewood.

Three feet of the ledge were dry; the rest was covered with snow. Growing along the edge of our refuge were giant pieces of groundsel, the leaves white with snow. Our porters scattered along the ledge and commenced little individual fires, using dead groundsel leaves for fuel. There was no room to pitch a tent, or even to place an ordinary camp bed. Accordingly, by the dim light of a hurricane lamp we chopped and dug and scraped, cut down groundsel, moved big boulders, and finally cleared a space about 7 feet wide and 15 long, into which we managed to squeeze our three beds, sloping at various uncomfortable angles. Then we put on all our clothes, crept into our damp sleeping-bags, and tried to doze. In the middle of the night a heavy snowstorm came up, and every half-hour or so a snowslide would slither off the precipice and rumble past our beds, missing them by inches, and scattering snow in our faces. In the morning it was still snowing hard, and along the brink of our ledge, like a rampart 3 feet high, was a bank of snow. Our kitchen utensils, stove, and cameras were buried deep; not a sound came from the direction of the porters, who were huddled together under heaps of rags and blankets. As soon as he noticed that we were up and about, Bamwamjala approached, looking like a mute at a funeral, and started talking mournfully to Oliver. In vain did we explain that the storm might continue for days or weeks, and that the longer the porters remained the nearer starvation they would be. Nothing would make those men budge. The witch-doctor blew his flute, and the snow came down harder than ever. When darkness fell we were still huddled on the ledge, with less than a day's rations for the party, and not a cigarette among us.

When morning came Oliver visited Bamwanjala, and from the grunts and squeals that came from the direction of the porters' camp, I concluded that he was warming them up artificially. The witch-doctor, as soon as he realized that the safari was really going to continue, bargained with the porters for 20 per cent. of their wages, in return for which he guaranteed to control the weather sufficiently to enable the expedition to cross the pass.

At two in the afternoon we started off. My camera man and I took our position at the tail of the caravan, together with the witch-doctor, who played on his flute incessantly. At 4.30, when at 14,500 feet, we were suddenly enveloped in a cloud. By the time the cloud had rolled by five of the porters, including the man carrying my bedding, had lost their bearings and had climbed 500 feet to an unscalable cliff. Finally, at 5.30 we arrived at the summit of the Scott Elliot Pass, and found the traces of the old Abruzzi camp. Here we rested while I left some records in a cairn and collected a few specimens of worms that were living in the moss. A worm is about the only living creature that I can think of that *could* enjoy life on the summit of the Scott-Elliott Pass.

All we thought of now was to get down and back to Fort Portal, for our food was practically gone. More than 2000 feet below was the camp in the Bujuku valley, where we proposed to sleep and where our relieving porters had been instructed to wait for us. Night was falling and the descent had to be made in the dark. One of the men started to weep, and this started them all off. Blubbering like a lot of babies, they still struggled on with their heavy loads on their heads. I went on ahead hoping to see a light that would guide me to the camp,

and continued to plunge on and down until after four hours I reached the Bujuku swamp that drains into the lake.

Goodrich and Oliver had remained behind with the porters, helping them negotiate the more difficult places and keeping them on the move. Time after time they sank in the deep snow and slush, and had to be goaded on. Loads were discarded and flung down the mountain-side, among the loads being my bed and my bedding. Meanwhile I was floundering through the swamp up to my waist trying to locate the camp: and when I arrived it was deserted. Our relief porters had failed us. Fortunately Captain Humphreys had left a supply of dry firewood, so I made a fire, and hoisted a lantern on a tall pole. The snow was falling so thickly at times that one could not see more than 50 yards ahead; and a thunderstorm came up besides. At ten o'clock Goodrich and Oliver and the porters arrived, pure white with snow from head to waist and black as ink with mud below. The temperature was 26° F. We had no beds, no blankets, no cooking utensils, no knives or forks, no food.

On the morning of August 29 we took a roll-call and found that Bamwanjala and five porters were missing. The others showed signs of refusing to obey Oliver when he ordered them to find their lost companions and recover some of the lost loads, so that we could get the stoves working and make some hot tea. By eleven o'clock one of the missing men arrived with his load, and by three in the afternoon only two were missing, Bamwanjala and the man who was carrying my bedding. At four they too turned up, having rescued my bedding from the swamp.

On the morning of August 30 I was awakened at six by a tremendous noise, and looked up to see the whole face of a glacier break away and come thundering down the side of the mountain. The lumps were as big as houses at the start, but by the time they reached the valley they were ground as fine as salt, and were heaped in an enormous pile within 200 yards of our camp.

We had now given up all hope of being relieved, so at ten o'clock we started down the valley, and met our ten relieving porters within a mile of camp. The way was through a swamp, of course, but a peculiar kind of swamp, full of large round tufts of grass like cushions, 3 feet high and very wobbly. By jumping from one tuft to another we tried to avoid the swamp itself; but every few minutes one of us would lose his balance and splash into the thick black ooze. But the worst was over, and food was plentiful once more.

On September 1 we arrived at Ibanda, greeted by shouts of the native wives, whose husbands were returning to them wealthy beyond their wildest dreams, and when we pitched our tent once more at our starting-point Ibanda, the chief was there himself to greet us, dressed in a white cotton nightshirt and a dinner jacket!

"Have you any message for the people of America and Britain?" I asked the Kimbugwe, whereupon he posed before the movie camera and made the following speech: "Tell the people of America and England that the elephants are eating up all our crops, and our people are starving. The safaris come here and ask me to feed them. How can I feed them when the elephants eat everything? Come and kill the elephants, or we shall starve."

One of the remarks so often made during the discussion of papers that have been read before this Society is that the authors in their modesty have lightly

glossed over the hardships and discomforts they endured. If it were not for this very modesty of previous explorers of Ruwenzori I should have been able to equip my own expedition properly. As it was, although I carefully read all the accounts of Ruwenzori I could find, I never dreamed of, and therefore was not prepared for, the great discomfort and hardship that had to be faced. In spite of the fact that several other expeditions had covered the same ground, I had to consider mine merely a preliminary survey to secure information that should have been already available. However, with the experience gained, I now feel confident that if I am ever lucky enough to revisit Ruwenzori, I shall be able to make such preparations as will ensure that the taking of photographs will be a pleasure instead of a burden.

AIR AND WATER TEMPERATURES

Fort Portal ..	Aug. 13	Max. 74°F.	*shade*	Min. 58°F.			
„ ..	14	82	„	57			
Kasunganyanza	15	98	„	58	R. Hima	64°F.	
Ibanda ..	16	80	„	55	R. Mobuku	59	
„ ..	17	110	*sun*	58			
Mihunga ..	18	110	„	55	R. Luboni	58	
Nyinabitaba ..	19	not taken		45	R. Chowha R. Mahoma	56 54	
Kichuchu ..	20	not taken		40	R. Mobuku	46	
Bwamba ..	21	not taken		36	R. Mobuku Bwamba Falls	43 40	
Kaijongolo ..	22	48	*sun*	32			
,	23	56	„	32			
Freshfield Col	24	40	„	32	Stream water	32	
„ „	25	45	„	25	Streams frozen.		
Twin Lakes in Butago valley	26	45	„	30	Lower lake Upper lake	44 41	
Kitandara ..	27	46	„	31			
Bujuku Lake camp ..	28	54	„	26	Bujuku Lake	42	
„ „	29	58	„	27			
Kigo	30	65	*shade*	27	Bujuku R.	41	

An important item of our equipment was 6 yards of cheese cloth for straining drinking-water to remove suspended mica; and 10 pounds of Epsom salts for curing stomach-ache caused by drinking unstrained water. We could easily have used 20 pounds.

DISCUSSION

Before the paper the PRESIDENT (Colonel Sir CHARLES CLOSE) said: Mr. Carveth Wells, who has kindly consented to address us to-night, began life, I understand, as a railway engineer, but deserted that profession after a good many years for the task of exploring and travelling. During the carrying out of that task he has devoted himself to the study and development of a particular method of colour photography. You will see to-night some of the results of his studies in this particular respect. His photographs, I understand, are based on a study of colours as he sees them in Nature and exactly marks down on paper. He has a regular

scale of colour with many hundreds of tints and gets his slides coloured in accordance with those tints. It is an interesting experiment, and I believe it will be found to have brought Nature very close to us. Interspersed between the colour photographs we shall have some cinematograph films which he has taken. You will note how geographers are advancing. We have cinematograph films, and we may very soon have coloured talkies!

The particular area which Mr. Carveth Wells is going to describe and illustrate this evening is the country round Ruwenzori. Ruwenzori, as we all know, was discovered by Stanley about forty years ago and has been explored by many travellers, Fellows of this Society and others, notably by Mr. Scott Elliot, Sir Harry Johnston, Mr. Douglas Freshfield, Mr. Wollaston, and others, while one must not omit the finest work of all, the expedition of the Duke of the Abruzzi over twenty years ago. I can assure Mr. Carveth Wells that we are all looking forward to seeing his slides and to hearing his account of his journey.

Mr. Carveth Wells then delivered the lecture printed above, and a discussion followed.

The PRESIDENT: We are honoured to-night by the presence of Mr. Amery, and I ask him if he will kindly say a few words.

Mr. L. S. AMERY: I do not know that there is really very much that need be said after such an extraordinarily interesting lecture, but there is one thing I should like to impress upon you, and that is, as a feature of Britain's Colonial administration, the amount of care and trouble a Colonial Secretary has to take in order to collect a few years' arrears of head tax from unwilling natives in the back parts of Africa. No force is employed; no ill-treatment. An expedition is specially sent out, with Palm Olive soap and everything else, and equipped with plenty of money, to tempt the natives to climb up inaccessible mountains and so earn the money which then filters back into the revenue of the Uganda Government and figures in the financial statement of the Colonial Secretary in Parliament.

We have certainly listened with the greatest interest to an address which has been enlivened with humour as well as full of information. We were told something about the way in which the hippopotami at Jinja interfere with the golf course. Mr. Wells went over that ground twenty years later than I did. I remember even at Nairobi on the occasion of my first visit they were still telling the story of the difficult problem in cricket created when a ball was hit nearly to the boundary and a lion began to play with it. The field claimed lost ball, but the umpire said the ball was plainly visible; until the field could extract it from the lion the batsmen were entitled to go on running!

It is interesting to note the changes that have taken place in the country described. Motor roads in Kenya may not be perfect, but when I was there there was only one motor road and that not as perfect as the one we saw. It ran for about 15 miles north of Nairobi. Jinja had no main street; no beautiful Ibis hotel; merely two or three shacks by the banks of the Falls. I believe you were interested by that photograph of the Nile looking north from the Falls, as I was when I saw it just now and as I was when I saw the scene itself twenty-odd years ago. You look one way to the deep blue waters of the lake; then at the curving waterfall with great sturgeon and other fish trying vainly to jump up against it; and then northward at the clear blue-green hurrying water, going for thousands of miles through sudd, through desert, past ancient temples and great cities, until the Nile at last reaches the Mediterranean. It is one of those views that has real romance, as had also that picture of the hotel of the Mountains of the Moon. I have never had an opportunity of going so far west as to get even a glimpse of

those mountains. I have had my distant glimpse of Kenya and have spent a whole long day and some hours of the night looking at Kilimanjaro floating, a snowy upper world, in the midst of a clear blue sky; so far above that one looked at the horizon for a long time seeing nothing, and then suddenly, gazing upwards, one saw that floating island of snow, ever so high up; saw it through the afternoon hours; during moonlight and long into the night. There is nothing to equal that wonderful contrast between the vegetation of the tropics and the upper world of snow floating high above. It is possible to see a little of the same thing, though more tempered to our type of climate, in the South African Drakensberg, where I was two years ago. Driving up through fields of maize and wattle, peach and orange trees in blossom, one looks up at 70 miles of mountain wall picked out with new-fallen snow.

To the actual description of Ruwenzori I can add nothing. Certainly they do not seem to be comfortable mountains to climb. Speaking purely from the point of view of one who climbs not for exploration so much as for amusement, the right sort of mountain should be in a temperate zone and between 10,000 and 20,000 feet. Then you can always climb it and return to timber-line and water, have a good fire and a good camp. Still, there are those who look for real exploration and have their reward as our lecturer had his; above all, in the wonderful colour photographs which he has so beautifully translated for us on the screen. I think we ought to be deeply indebted to him for the work he has done and for the pleasure he has given us.

Mr. A. F. R. WOLLASTON: It is a very great pleasure, after an interval, to be reminded so vividly of scenes which were once familiar. Twenty-three years ago I was with a party of naturalists, of whom two survived the War, and we spent seven months on Ruwenzori, mostly above 6000 or 7000 feet. We scrambled up many of those mountains and crossed passes, and left our cards in various places. A great many of the scenes shown to-night are familiar, and it seems to me that it is much easier now than it used to be to travel there. It took us three weeks to walk from Entebbe to the foot of the mountains and we were very slow in going up. We were after rats and mice and things of that sort and saw a good many more than Mr. Wells appears to have done. On the top of the Freshfield Pass we found fresh tracks of leopard, which shows that there are animals up there, and we were kept awake at night on the snow-line by the cries of hydraxes, curious little animals that live up in the mountains and are the cause of the tracks up Ruwenzori. The tracks were not made by the Duke of the Abruzzi; they have existed for a very long time and were made by native hydrax-hunters. Then came Sir Harry Johnston and other explorers, and whilst we were there came the Duke of the Abruzzi, who stayed with us in our camp at Bihunga. He went to the tops of the highest peaks and made a very complete survey of the range.

The lecturer has not in any way exaggerated the colours on Ruwenzori: that would be impossible. They are more wonderful than any colours that I have ever seen anywhere, but what Mr. Carveth Wells cannot get, and no photographer can, is the atmosphere, of a wonderful limpid luminosity, which distinguishes Ruwenzori from any other mountain range that I have visited. I cannot agree with Mr. Wells when he says that there is no pleasure in a journey to Ruwenzori. Some of the happiest days of my life were spent among those mountains, and I look back on them with unfailing pleasure. I will not take up any more of your time, but I would like to congratulate the lecturer most heartily on his wonderful achievement.

Brigadier-General E. M. JACK: Mr. Wells has given us a most interesting and entertaining account of his adventures on Ruwenzori. It is a good many years—I am not going to mention the number, as Mr. Wollaston did—since I was on

that mountain, and then I did not attain to the height that Mr. Wells did. Nevertheless, I most willingly testify to the cold and discomforts that we experienced at about 10,000 feet, the highest point reached in the course of my work.

Mr. Wells has told us a good deal with regard to his methods of getting true colour on Ruwenzori. I agree strongly that colour obtained by personal observation is likely to give more harmonious results than it is possible to get in any other way, but when we speak of true colour it seems to me that we are venturing into rather deep waters. What is true colour? We all know that if two artists—I am not speaking of modern artists whose ambition is to get away from Nature, but old-fashioned artists—sat down to represent the same scene faithfully they would produce quite a different result. Some of you may have heard the story of the two artists of the Glasgow school who were discussing colour. One said to the other: "Do you see your greens green? I see them a pearly grey." That shows that different people see colour in a very different way, and the problem of getting true colour is not an easy one. I should like to add my testimony to the very great pleasure that Mr. Wells' slides have given me. I think they produce a result that is far more pleasing than the so-called natural colour photography.

The PRESIDENT: We have listened to a most interesting lecture, and have seen some slides in colour of a kind we have not seen before. We may well believe that the colours arrived at by Mr. Carveth Wells by his own special method are probably preferable to those which can be got by mechanical methods.

I should like to add a word with regard to the nomenclature of Ruwenzori. I was talking it over with Mr. Carveth Wells this morning. First of all you have the great range, 60 or 70 miles long, of Ruwenzori, and then part of it is called Mount Stanley, with two peaks called Margherita and Alexandra. This Society is gradually tending, as far as it can, to get rid of names of that kind; but eventually we shall be saddled with few names of that sort which we cannot avoid. But see how complicated it is: here is a range, Ruwenzori, a part called Mount Stanley and another part Mount something else, while Mount Stanley has its two peaks, one called Margherita and the other Alexandra.

Mr. Carveth Wells has shown that he can not only give us admirable photographs but that he can describe them in a very racy way. In your name and the name of the Society, I thank him for a very interesting lecture.

Note on the Results of Mr. Carveth Wells' Method of Recording Colour

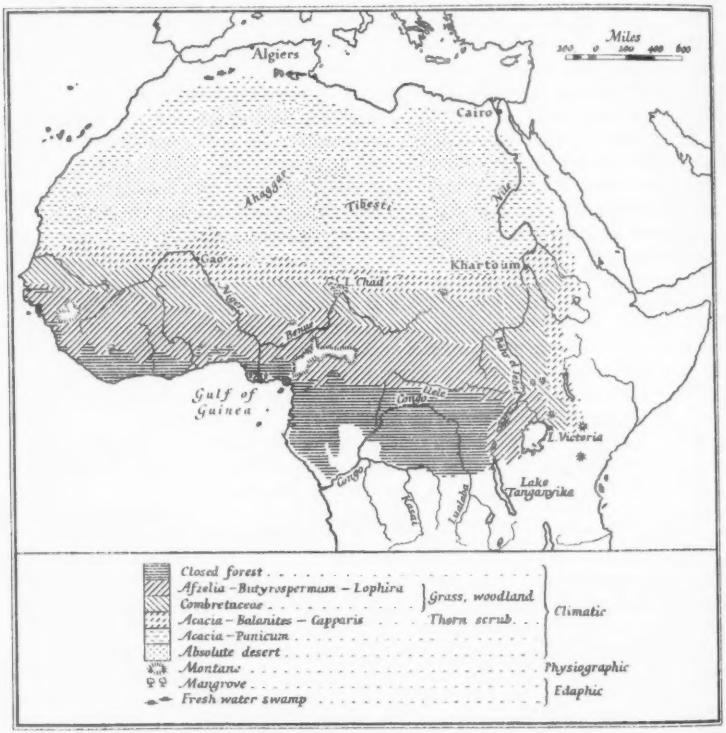
Those Fellows of the Society who had the pleasure of hearing the lecture will remember that the lantern slides shown by Mr. Wells were a great deal above the usual standard of beauty in colouring, and they gave the impression that, under the limitation imposed by colouring a picture whose basis is a black and white photograph, the method of recording by coloured tints in a specimen book and afterwards reproducing those tints had, to a great extent, justified itself.

We had hoped to be able to reproduce in the *Journal* a few plates worthy of these results, but have met with insuperable difficulties. The usual semi-automatic four-colour process could not for certain technical reasons be applied to the transparencies which were kindly supplied by Mr. Wells; and the alternative method of preparing colour plates by hand from the coloured transparencies proved to be far from doing justice to the original. We have therefore regretfully limited ourselves to reproducing one plate, which shows the unnatural colour of the peculiar vegetation on Ruwenzori; and we were assured by the late Mr. Wollaston that this really is a successful representation. It makes therefore a good example of the value of Mr. Wells' method. We very much regret that the imperfection of processes of reproduction forbade more varied and ambitious results.—ED. *G.J.*

THE VEGETATION OF THE CENTRAL SAHARA

DR. T. F. CHIPP

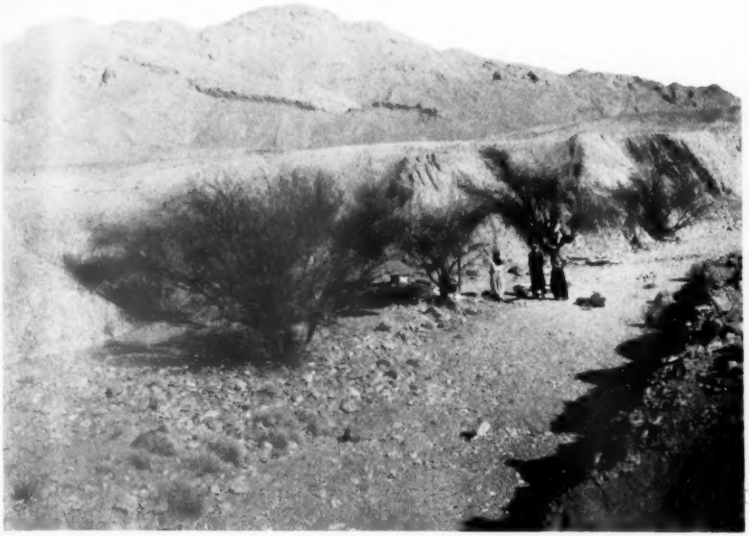
IN the *Geographical Journal* for February 1930, by way of introduction to a description of the vegetation of the Anglo-Egyptian Sudan, I gave a brief résumé of the vegetation of North Tropical Africa. Since that paper was written an opportunity has occurred for me to visit the Central Sahara and to investigate an area which was botanically unknown. The region in question lies between the Mediterranean vegetation on the southern slopes of the Atlas



Vegetation belts of the West African Botanical Region

Mountains and that to the north of the bend of the Niger in Afrique Occidentale Française.

On the map which accompanied the previous article, and is reproduced again here, is shown the Desert belt of vegetation, which is the northernmost of the West African Botanical Region. An indication of the character and actual occurrence of the vegetation over this central portion of the Sahara had been obtained from the reports of travellers, but more especially by deduction



Acacia in ravine in mountains 10 miles north of Abelesa

Vegetation, chiefly tamarisk bushes, in gorge of Arak

Boulder-strewn camel track between Abelesa and Silet

Outflow of artesian well in oasis near In Salah bathing pool

from what we know of the natural conditions over the northern half of the continent of which it forms part.

One scientific expedition which included a botanist had penetrated as far south as the central mountains of the Ahaggar massif. This was the expedition organized and sent out by the Governor-General of Algeria in 1928. The botanical investigations were entrusted to Professor René Maire of Algiers.

Early this year I was privileged to accompany an expedition fitted out and financed through the generosity of Mrs. K. MacIver, F.R.G.S. The investigations begun by Professor Maire and carried as far as the central Ahaggar were continued through the western Ahaggar as far southwards as the beginning of the tanezruft at the oasis of Silet.

Mrs. MacIver's expedition set out from Algiers in February, in two of the Delahaye 10 h.p. camionettes which had carried the Prince Sixte of Bourbon and his party across Africa to Lake Chad the year before. The route followed was across the Atlas by way of Jelfa and Laghwat, thence to El Golea, Fort Miribel, and In Salah to Tamanraset on the south of the Ahaggar Plateau. The cars were left here and the country to the west and south-west was explored on foot. Finally the cars met the party at Silet and the return journey was made by the same route.

Our party left Algiers on February 19, and crossed the Tellien plain to the pass at the foot of the Atlas at Blida. We entered the famous gorge of La Chiffa and ascended through the vineyards among the snow-clad mountains. We intended to take a short journey the first day, to try out the cars, and after passing the highest point of the route at 4050 feet, south of Medea, stopped for the night at Berwagiya. Despite the cold wind and snow, the temperature on our arrival was only 45°, and it was with something of a shock, when we roused the following morning to continue our way, that we found a heavy snowstorm had set in. Here we were snowbound for three days, as the exposed road over the mountains was blocked to all traffic. The railway was still working, however, and we were able, on the evening of the third day, to move the whole convoy by train to Boghari, a distance of only some 50 km., but beyond the snow. The run from Boghari over the Hauts Plateaux was over a well-made road through one of the most famous grazing grounds in Africa, where the alfa plains provide the esparto grass which is exported chiefly to England for the manufacture of paper.

At Jelfa, the terminus of the railway, on the Saharan Atlas range, we halted to fill our containers with petrol. Our information as to the state of the petrol dumps in the Ahaggar had been anything but reassuring. As we could not afford to risk being stranded in the desert, we carried a sufficient reserve of petrol to enable us to operate over a distance of 2500 km. By taking on these supplies at Jelfa we avoided carrying them up over the Atlas, and were able to purchase at 11·50 francs per 5 litres. Later, at Tamanraset, we were asked the same price for 1 litre.

The first-class road continues as far as the oasis of Laghwat, which nestles on the southern slopes of the Saharan Atlas, overlooking the long rolling grazing country of the Dayas region. Thence is the piste—or track—which we were to follow for the next few weeks, and which is excellent at this time of year. The country is still clothed generally with vegetation, in the form of

tufted bushes and grasses, some 18 inches high, and the depressions contain groups and bands of trees, principally the betoum (*Pistacia atlantica*), surrounded by natural zarebas of the jujubier (*Zizyphus Lotus*).

About 100 km. south of Laghwat, soon after passing the caravanserie of Tilremt, the nature of the country changes and the piste, in a series of switchbacks, crosses the rocky Shebka region, with stony valleys, where wiry herbs eke out a more precarious existence. The altitude of 1600 to 2000 feet was generally maintained until the oases—collectively referred to as Ghardaya—were reached in a deep hollow some 200 feet below the general level of the country.

This stony Shebka region continues for another 100 km. or so south of Ghardaya until the Northern Sahara can be considered to be definitely established. The country now falls away gradually, in a series of steps, the piste running between bare rocky escarpments, flat-topped or pyramidal sandstone hills, or dunes of rather unstable sand. With the advent of more sand the vegetation generally over the countryside is more pronounced; tamarisk and the laurier-rose (*Nerium Oleander*) are the biggest trees on the low ground, whilst escarpments are crowned by the purple- and white-flowered broom (*Retama raetam*).

Where one of these stretches of country runs out into a vast sandy plain the famous oasis of El Golea at 1200 feet is to be seen surrounded by its masses of date palms, between which rise the spire-like tops of the typical Mediterranean cypress (*Cupressus sempervirens*). The locating of this piste has been a great achievement, and has enabled ordinary touring cars to thread their way between the outlying dunes of the Grand Erg Occidental on the eastern edge of which El Golea is situated, and the Grand Erg Oriental a short distance to the east. Here, as at Laghwat and Ghardaya, there is a comfortable Transat Hotel, sufficiently luxurious for the requirements of any tourist who ventures so far.

After leaving El Golea, conditions change and the luxury of civilization is left behind. The rains over the country to the south become more irregular, and there is a general decrease in the development and constitution of the vegetation. The rain is not sufficient to maintain a general wealth of perennial plants, and ephemeral plants have but a short existence after the rains. For the first 20 km. out of El Golea the piste runs over hard salted sand where masses of tamarisk grow along the waste waters of the oasis, which gradually disappear under evaporation.

The piste then gradually ascends, winding its way between huge sand hills, from which the wind constantly blows trails obliterating the track. Dwarf tufted herbs occur and tamarisk and *Retama* still occupy the weds. At 105 km. from El Golea however the piste ascends on to a vast rolling plateau, the surface covered with black stones lying on clay. It is good going in the dry season, but very treacherous after rain, when cars easily sink in axle-deep. The vegetation is now confined to depressions, and this desolate stony country forms the beginning of the Tadmait Plateau. On the edge of a little wed, in which tamarisk and *Retama* again occur, is situated Fort Miribel, built round a well, and now used as a caravanserie.

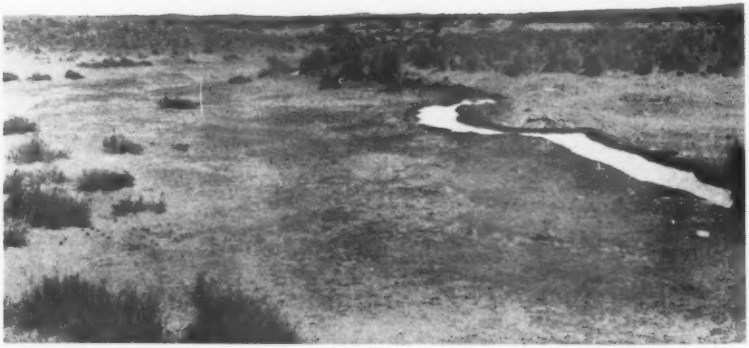
We left Fort Miribel an hour before dawn as the piste over the plateau is easy to follow by the headlights of a car. We had not gone far before we ran into a series of heavy thunderstorms, with much rain, and a strong biting wind blow-

Sand-dunes encroaching on In Salah palm gardens

Neglected date palms at abandoned oasis of Silet

UNIV. OF

Beginning of seepage channel: neglected date palms in background



Surface flow from seepage channel about 50 yards from start: clumps of grass, Imperata cylindrica, indicate presence of underground water near the surface

ing from the south. Although we had passed this storm area by 8 a.m. the sky remained overcast and the wind cold until we reached the steep southern escarpment of the plateau 150 km. south of Fort Miribel. Here an excellently graded piste, at places cut out of the hill-sides, enables a rapid descent to be made from 2200 feet to 1700, and then to 1500 feet.

The change in the vegetation is almost instantaneous. The shallow saucer-like depressions on the plateau had been getting fewer and farther between and the vegetation in them more scanty and more dwarfed. Here in the ravines at the foot of the escarpment were trees of moderate size (*Acacia Seyal*) and tufted herbs amongst which prominently figured the desert grass, *Panicum turgidum*. There were some herbs of the plateau flora still to be found for the space of a few weds, but the significant fact was that the Mediterranean had been left behind and Africa had been entered at the Plain of the Tidikelt.

Thence onwards the face of the country was changed, and for nearly 100 km. we traversed a flat expanse of sand with the horizon broken by jagged flat-topped sandstone hills. Over all this stretch there was no evident sign of vegetation. The piste was marked at intervals by a pile of a few stones, or, later, by an occasional single stone, for there was little but sand to be seen. We were unable to take advantage of this level track, for the following north-east trade wind was travelling at about our pace, and this necessitated frequent halts to turn and face the wind to cool the water in the radiators of the cars.

On approaching In Salah progress was even more difficult. The last 30 km. of the piste run through a region of ever-moving sand dunes, where the guide-posts are small cement cones placed at intervals on the sand and moved as the harder parts of the ground become covered or exposed. Here, always in dread of being overwhelmed and obliterated by the moving sand, is the town of In Salah, and its neighbouring palm gardens.

The same type of sandy waste with practically no permanent vegetation, except the almost buried tufts of *Panicum*, extends for an equal distance to the south of In Salah, and then the sandy-bottomed gorges of the Muidir are entered. The sharp ranges of hills of bare black sheet rock, with masses of black boulders along their bases, are the characteristic features. There is always some sand in the bottom of the valleys, ravines, and gorges, and here the wed type of vegetation, characterized by the *Acacia* tree and tufted *Panicum* grass, is always to be found, and, where the weds are broadest, little woods of tamarisk appear. Throughout most of the gorges of the Muidir, difficulty was experienced through the water overheating in the radiators of the cars, and one memorable afternoon it was a question of travelling for a matter of ten minutes and then halting to face the wind for fifteen. In the gorge of Arak the vegetation over the sandy bottom is more abundant than elsewhere, and tamarisk occurs in considerable quantities in addition to *Acacia*, *Balanites*, and other small trees.

South of the gorge of Arak the track ascends, and by the time the mountain Tesnu is reached one may consider that one has definitely climbed on to one of the spurs of the Ahaggar massif. Whereas before the piste threaded its way through gorges, it now runs over a sandy plateau through which had been thrust these black rocky mountains, rising 1000 feet and more, bare and devoid of all plant life.

Dr. Chipp's route into the Central Sahara

Shortly after leaving the borj (blockhouse) and well at In Eker the main peaks of the Ahaggar, rising to over 10,000 feet, and 6000 feet about the general level of the country, are seen to the east. These had been the objective of the expedition with which Professor Maire had travelled. Skirting them the piste leads through Tit, and then up and down across the lower rocky spurs to Tamanraset, on the southern edge of the plateau, at 4350 feet. Here our cars were left, a train of baggage animals was collected, and with one goumier, a camel driver, and a "boy," we set out on foot to explore the western Ahaggar, which was botanically entirely unknown.

Our first objective was a group of mountains standing out prominently to the west, which we had remarked on the way south, but which do not appear to have any specific name. We left Tamanraset in the afternoon of March 9 and followed the broad sandy weds westwards over the plateau. There was a cool north-east wind and walking was an agreeable exercise. It also gave an opportunity to examine the vegetation more closely, although the pace was rather more than that kept up by the baggage train. At night a halt was made in a wed where there was pasturage for the animals, and this night, and each other night during our march, we slept out under the moon and stars. Our food we carried with us and we had sufficient water-skins to render us independent of supplies for forty-eight hours.

The following morning, just before dawn, the minimum thermometer, which had been lying in its open case on the ground, registered 33° F., and there was ice in the waterskins. During the course of the day we worked to the west of the plateau, where we were sheltered from the cool winds. There was now a marked difference in temperature, and in the shade at midday it was always in the neighbourhood of 100° F. This variation of nearly 70° in temperature in some seven hours we experienced on most of the days we were travelling through this country. When the effect of the cool breezes was not felt, walking was much more trying, but as a rule it was possible to cover 20 miles in a day on foot without undue stress.

Our immediate objective was the village of Abelesa (22° 54′ N., 4° 54′ E.), and our track led alternately over razor-back ridges of bare rocky hills strewn with boulders, and then across sandy weds of glaring white sand through which the black rock outcropped at intervals. In general there was no change in the vegetation; the *Acacia*, now covered with its sweet-scented balls of yellow flowers, and the *Panicum* grass, with their associates, providing the vegetation in every wed. In the older and broader weds however the tamarisk was always present, and, where water was near the surface, stretches of the tufted grass *Imperata cylindrica* gave an almost marsh-like setting.

Some 10 miles north of Abelesa, and at a height of 3200 feet, we came to the foot of the mountains which we had seen several days before, and which were the prominent feature of the western Ahaggar. The country around was a boulder-strewn basin in the hills, black rock and stones were everywhere. In one of the deep ravines which intersected the country, we halted and here made our base for examining the surrounding country.

It was now realized that a mistake had been made in having both donkeys and camels in the baggage train. The donkeys had been chosen as being more convenient for carrying the botanical and photographic equipment, as what

was required could be reached conveniently from them instead of with difficulty as from a camel. This area, in which we intended to pass a few days, was entirely devoid of water, so we had to send the donkeys to Abelesa to be watered every other day. This prevented our having the use of the animals to the extent we required.

A general reconnaissance of the mountains showed that instead of yielding botanical records of interest and possibly providing another link for the African montane vegetation, negative results only were to be obtained. There were no weds leading into a mountain mass, as is the case in the central Ahaggar, but a narrow range of almost bare, rocky mountains, rising into five peaks at a height of some 2000 feet above the plain, and not exceeding a total height of 5000 feet. This was a great disappointment to us, as, from the place where they were first sighted, and from which the central Ahaggar peaks could also be seen equally well, they had appeared to be of considerably more importance. It was not realized at that time that the plateau of the western Ahaggar fell away so generally that mountains of only 5000 feet would be shown in such great relief. It happened moreover to have been a remarkably clear day when these mountains were first sighted, at a distance of some 70 km., and on no other occasion were they visible at anything like that distance. It was obvious from our preliminary reconnaissance and examination of the lower slopes that no vegetation could exist towards the top, and accordingly camp was struck and we retraced our route to Abelesa.

From Abelesa a route to the south-west was taken so that the oases of Silet and Tibeghim could be examined. This route, which was crossed in two days' march, was over the hottest, blackest, and most desolate country imaginable. For a large part of the journey even the sandy weds with the friendly *Acacia* trees disappeared, and the march was over black pebbles and stones, between huge black boulders, and hemmed in by hills of black sheet rock. It was very remarkable therefore to find in an occasional depression some plant life, amongst which was the tufted bush *Solenostemma argel*, whose vivid green leaves provided a remarkable picture in the landscape.

Silet (22° 40′ N., 4° 30′ E., alt. 2500 feet) is at what might be considered the end of the Ahaggar plateau in this direction. Its new blockhouse, or borj, stands out for many miles in a desolate stony plain, perpetually windswept from every direction, and over which a fast-moving mirage is at play during the greater part of each day. Some fifteen years ago the local population of Silet and Tibeghim, some 5 miles south-west, had been exterminated in a raid, and these oases have not since been inhabited. They provided excellent opportunities therefore for a study of the natural vegetation of an oasis, the only introductions remaining being the neglected shaggy and tufted date palms.

Silet is on the edge of that neck of the tanezruft which encircles the Ahaggar plateau on the west and south. The next water-hole is over some 400 km. of waterless stony plain, into which we were not justified in penetrating. Some idea of the extent of the occurrence of vegetation over the area to the south was obtained from the diary of a French officer, who was passing Silet with his goumiers. It appeared that there was on an average about one *Acacia* bush in 50 km., and a tuft or two of dry desert grass in between. It was a type of country which did not urgently demand botanical exploration! Southwards it stretched

to the barren Adrar des Ifoghas, which are in touch with the vegetation influenced by the Niger.

Our cars came round from Tamanraset, and leaving our baggage train to make its way home, we returned to Algiers by the same route as we had come.

The vegetation of oases has always been a subject of interest. It has even been considered that there is a vegetation peculiar to these places, although such reports as are available tend but to show that the plants not occurring in the local flora have been introduced as seeds with the crops, or are incidental in packages of merchandise. In the fifteen years that the two oases of Silet and Tibeghim had been deserted, normal conditions for an oasis, if there is such a natural feature, should have been re-established, and the examination of these two localities promised to be of interest.

Silet is on the piste from Tamanraset to Gao; its water supply on the edge of a stretch of tanezruft is important, and consequently the military authorities had determined to build a new blockhouse around the well. This work had been in progress for some months. Artisans had been brought from In Salah, for the Tuareg of the country is not versed in city ways, and a few plots of barley had been put down under irrigation. The general features of the locality were undisturbed however, and its abandoned state was easily recognized.

Tibeghim, 5 miles south-west across the plain and well off any track, had not even had this attention, and could be studied entirely in its undisturbed state.

On approaching Tibeghim in the late afternoon we were immediately struck by the gaunt shaggy date palms standing out on the plain against the sky like great columns, and reminding us forcibly of the ruins of the ancient Roman cities in the north of the continent. They were so unlike the palms to which one was accustomed, with clean bare stems crowned by a spreading tuft of leaves. There was other vegetation, but on closer inspection it was seen to be that of a wed crossing the plain in which the oasis had been located.

The woody vegetation was again *Acacia Seyal*, with its balls of sweet-scented flowers, *Balanites aegyptiaca* (whose closely set spiny branches held stones which had at some time been thrown to dislodge its palatable fruit), the tamarisk, and, in this particular wed, a rather more than common growth of bushes of *Salvadora persica*.

In and out among the shingle of the wed were the usual dry tufted herbs, including the desert grass *Panicum turgidum*. It was only where the old palm trees grew thickest, and where there was still a pool of salt water, that there was any vegetation different from that of the countryside. This on examination proved to be a rush, *Juncus maritimus*, which is to be found growing in salted sand all over the Sahara.

The examination of this locality showed conclusively that an oasis is an entirely man-made place of habitation, and that it ceases to be an "oasis" so soon as man's control is removed. The vegetation introduced rapidly dies out or lies dormant as seed, even the date palms grow tufted and soon degenerate. The water supplies get filled in by wind and torrent, and the only vegetation is that normal to the wed in which the oasis happens to have been located. It follows then that any depression or dry river-bed, located on the drainage system of the general country where the water-table is not too low, is a potential

oasis, and that the vegetation of that oasis will be that of the countryside around, with such other plants as are introduced through man's agency.

The Ahaggar is reputed to have only one natural spring. The water supply to oases, such as those to which reference has just been made, is obtained by seepage from the wed or dry river-bed. The seepage hole may be round and deep, forming a well from which the water is hoisted in a skin, pulled up by a rope passing over a cross-piece and towed away to its limit by a donkey, camel, zebu, or even by small boys. On arrival at the surface the skin empties into a trough or channel, and is lowered again. This is the usual means of supply in the larger oases in the north.

In the more southern parts water is obtained from small channels containing flowing streams which are directed towards the barley and wheat plots. The channel begins often 100 yards or more distant "upstream" from the cultivated plots. Holes some 8 to 10 feet deep are dug in a line at frequent intervals, and are joined together underground to make a narrow channel. After a short distance the channel is open throughout, and, farther on, when led into the plots it is shallow and often carried over depressions by little aqueducts. The length of the seepage channels enables the water which collects at the head of the system to be supplied in sufficient quantity to maintain a flowing stream after a distance of 20 to 50 yards.

As the seepage water gradually drains out new systems may be opened, and the whole work has to be reorganized after the very occasional torrential storms which bring the water down the weds in spate.

In the previous paper (*G.J.*, 75, 1930, pp. 123–127) it was explained that the vegetation of this part of the continent might conveniently be considered to be controlled by four sets of factors: climatic, edaphic (soil and ground water), physiographic (chiefly altitude), and biotic (when controlled by man and other animals).

The climatic climax, or climatically controlled vegetation, was not seen. There are, in the region of the Sahara which was traversed, two kinds of vegetation. One is the permanent vegetation of the weds, the other the "asheb" or ephemeral vegetation which springs up from dormant seed generally over the countryside, and flowers and matures within the brief space of a few days after one of the occasional storms. This asheb is the only vegetation which can be considered as belonging to the climatic climax. No rain was experienced in the area traversed in the Central Sahara. In most places there had not been any for a few years.

The Desert or Saharan belt of the West African Botanical Region is beyond the limits of permanent vegetation which can be maintained by climatic factors. It is an interesting point, and one which illustrates the fact that discussions on the influence of climate on vegetation most often resolve themselves into discussions on rainfall and vegetation. As has been emphasized elsewhere, it is the whole climatic complex which must be considered, and here in the Sahara there is in many areas sufficient rainfall to maintain the vegetation of a climatic climax. When however the daily range of temperature is frequently some 70° in the space of six hours, and there are continuous desiccating winds, other climatic factors must have a determining effect

The permanent vegetation belongs to the edaphic climax, and is dependent on the capacity of the ground for retaining the necessary amount of water between the times when storms occur. As a general fact it may be stated that, in the part of the Sahara traversed, wherever sand exists, in not too unstable a state, some vegetation at least can eke out an existence. It is on the stretches of bare rock, and country of stone and clay, baking into a hard iron-like surface, that vegetation cannot exist.

The Ahaggar plateau itself, which is estimated to cover an area about the size of England, gives one the impression of an elevated sandy region through which have burst chains and masses of rocky mountain peaks. On the mountain sides themselves there is no vegetation. Between the mountain chains and ridges, and among the groups of peaks, vegetation is generally found on the drainage lines, drainage plains, sandy weds, and in the more recent rocky ravines where sand has accumulated.

The vegetation consists of dwarfed stunted trees, amongst which the acacia is universally dominant, stunted bushes, dry tufted herbs with woody root-stocks, and grasses. On a drainage plain the vegetation is scattered generally, elsewhere it is contracted into drainage lines, or confined to sandy weds. In the latter case it is most noticeable where a wed wanders across one of the vast reg plains, formed of stones and boulders resting on a clay surface, and devoid of vegetation.

So far from being without vegetation, then, the greater part of the Sahara has a permanent vegetation of trees, shrubs, and bushes, of an edaphic climax, confined to the general drainage system of the country. The same type of vegetation is to be found right across the continent, and on the eastern side expands under local influence into the general Thorn Scrub of the Anglo-Egyptian Sudan.

Owing to the nature of the bare sheets of rock forming the mountain tops of most of the known Sahara mountains, the physiographic climax has only been recorded from one region. The central mass of the Ahaggar rises to over 10,000 feet, and in the biggest ravines and fissures of the mountains Professor Maire, in the 1927–1928 expedition, found the vegetation to be of a distinct Mediterranean type. No record was obtained of the African montane vegetation, so that the connecting link of this vegetation with that of the mountains of North Africa has yet to be found. The examination of the mountains of the western Ahaggar, which it was hoped would yield results, showed that the local conditions did not permit any vegetation to exist. From information obtained it would appear that the remaining unexplored mountains in the west, the Adrar des Ifoghas, are not likely to be any more profitable. There are still two mountain masses to be explored botanically which may yield much of interest for the physiographic climax: the Aïr mountains and the Tibesti range. There is hope therefore that the "missing link" in the connection of the montane vegetation between the Atlas mountains and the equatorial groups may yet be found. The results of the present expedition showed only that under conditions now existing nothing further in this connection is likely to be found in the mountains of the central Western Sahara.

The biotic climax, or control exercised by man and other animals, was in evidence in a marked degree throughout the whole country traversed. In fact

the impression gained was that there was hardly a tree or plant which had not at some time been grazed or browsed by wild animals or the flocks and herds of the nomads. Animals of both these categories range over enormous tracts of country to obtain the little forage available in each locality, and the desert animals especially appear capable of going for long periods without having access to water. The recent pacification of the country must result in increase of population and of domestic animals, chiefly camels, goats, and donkeys, and a greater demand than ever will be made on the natural vegetation. There can be no doubt but that the demand will soon become greater than nature can supply or even replace, with the consequent extinction of the vegetation of the country generally. What this will mean in the case of the herds can best be imagined in a land where it does not seem possible that fodder supplies can be augmented to any considerable amount by the efforts of man.

There was no difference in the method of cultivation practised in the oases visited, and in all of them, so far as native cultivation was concerned, the crops at the time of our visit were the same. Small plots of ground, rectangular and about 9 feet long, were bounded by small earth ramparts. Irrigation was effected by flooding every few days, the water being directed into each plot successively by opening or damming the channel of the open conduit. Barley was the chief crop, and the foliage was kept cut to within a few inches of the ground, until the flowering spike appeared, in order to provide fresh fodder for the animals. Two crops could be grown in the season. Wheat contributed to the general food supply, and millets also. Other and more incidental cultures were onions, tomatoes, gourds, mint, fennel, and similar household herbs. Fig trees were seen at the bigger oases such as Abelesa.

At El Golea (30° 7′ N., 2° 11′ E., alt. 1200 feet) the gardens are deservedly famous. The garden belonging to the Officer Commanding has been maintained for some thirty years. It was surprising to find such a variety of trees, and the continued interest of successive commanders was evidenced in the care taken in the upkeep of the garden. Trees of North America were represented by the locust (*Gleditschia*) and the osage orange (*Maclura*). The Persian lilac (*Melia Azedarach*) of Northern India, the pepper tree (*Schinus molle*), and the *Jacaranda* of Tropical America made a pretty sight. From Australia there were the she-oak (*Casuarina*) and several eucalyptus. The sweet-scented South African *Acacia farnesiana* was in flower. Dates and *Pritchardia* provided the palms, whilst the Atlas Mountains were represented by the pin d'Alep, the pyramidal cypress, ash, elm, poplar, carob, betoum, and the laurier-rose. Coconuts were not a success. The chief fruit trees were oranges, mandarins, lemons, apricots, peaches, and prunes; whilst in the garden there were plots of strawberries, violets, and broad beans. The water supply, welling up from an artesian well in one corner of the garden, was surrounded by a grove of eucalyptus.

One private garden near by was worthy of particular notice. Each irrigation plot, covered with barley and edged with violets and strawberries, had its fruit trees, apricots—in flower—oranges, lemons, cedrats, and mandarins, heavily laden with fruit, whilst down the middle of the garden was a walk edged with fragrant roses, and with jasmin trailing over a trellis. Dates and fig trees completed the picture. This was no ordinary garden however, and its wealthy

native owner gave much attention to his work and had ample supplies of stable manure. His oranges alone brought him in 20 francs per hundred.

At Tamanraset, nearly 1000 km. to the south, the elevation of 4350 feet permitted many small crops to be grown in the officers' garden. The locust tree and tamarisk were planted for shade. Fig trees, peaches, prunes, apricots, and almonds were thriving, but the date palm eked out a very precarious existence. The plots were planted with barley and wheat, which alternated with garden supplies of chicory, radish, celery, green salads, onions, lettuce, cabbage, spinach, strawberries, broad beans, peas, carrots, potatoes, lucern, beetroot, artichokes, asparagus, haricots, turnips, cucumber, tomatoes, and melons. The curious custom was here observed of allowing the gardener to grow a row or two of barley along the inside of the irrigation ditches. Needless to say these ditches became very wide and the barley was the best of the plot!

The difficulty in all these irrigated plots, a handicap experienced everywhere where cultivation is attempted, is that after a while, owing to the excessive evaporation, a deposit of white salt is left on the ground, which then becomes incapable of further cultivation unless manure can be obtained. In some places this ground, which from a distance appears to be covered with snow, so thick is the salt deposit, has become occupied by a coppice of tamarisk and a close growth of the reed *Juncus maritimus*.

By more careful cultivation, and the opening of additional sources of water, the oases can undoubtedly be made to give greater yields than they do at present. This extension must be very limited however and can hardly have an appreciable effect on the problem of the settlement of the warlike tribes, which, in this century, have to be provided with suitable occupation and means of subsistence.

As a result of this expedition it has now been possible to sketch in definitely the nature of the vegetation extending over 1000 km. of country occurring between the Mediterranean belt in the north and those of the Gulf of Guinea in the south. It had been possible from a general study of the continent to form an idea of what might be expected, and the records and information obtained entirely confirm these expectations. Only in the case of the montane vegetation were negative results obtained.

The meteorological records obtained have been examined by Dr. C. E. P. Brooks, who has published a note on the subject in the *Meteorological Magazine* (vol. 65, 1930, No. 774). Thanks are due to the Royal Geographical Society and to the Director of Meteorological Services, Algiers, for the loan of the necessary instruments. A detailed record of the botanical information will be published in the *Kew Bulletin*.

It remains but to record a note of cordial appreciation of the assistance and of the kindly reception given by the French authorities, not only in Algiers, but in each of the oases through which we passed. It was entirely due to their courteous co-operation that we were able to traverse so much of the country in the short time at our disposal.

THE MOUNTAINS OF CENTRAL ASIA AND THEIR NOMENCLATURE

PH. C. VISSER

THIS subject, handled by Sir Sidney Burrard, Mason, Longstaff and others in the *Journal*, has been of great interest to me for some time. Having thrice visited the Karakoram regions I felt the necessity for a revision of the nomenclature, although at the same time I quite understood how undesirable it would be to make more alterations than were strictly required. In the words of Mason (*G.J.*, 75, 1930, p. 41), "I base my desire for a revision of the nomenclature on the ineffectiveness, inconvenience and inaccuracy of the old." I am now in Chinese Turkistan, without the necessary literature and maps, but as the Editor has invited the judgment of other Karakoram travellers before the conference of this summer, I venture to state my views.

Although the time may not yet have come to enter into details, one can certainly now already draw attention to the main divisions of the Central Asian mountains. I even believe that this is most desirable, because if put off much longer, the chances are that it will be elaborated upon grounds which may perhaps afterwards prove less correct. The solution here, more perhaps than anywhere else, must be sought in a compromise between geographers and geologists. The geographer will be readily inclined to accept a large river valley as a division between mountains. The Indus, in its course from east to west, forms a striking boundary, for a geographer, between two great mountain systems; the Hunza river below the Batura glacier in its course from north to south likewise forms a dividing line between two lofty mountain groups; and as this river is in the most westerly part of the Karakoram main chain, it is only natural that the geographer will be inclined to consider the striking Hunza gorge as the western extremity of the Karakoram, and to include the mountain group on the other side in a more westerly mountain system. For the geologist a river will be little else than an accidental phenomenon in the tectonic build of the Earth's surface. It will perhaps not be difficult for him to prove that the mountains north and south of the Indus valley arose in the same geological epoch, and that we find the same geological formations in both mountains. It will be still easier for him to show that the group west of the Hunza river dates from the same geological epoch as the chain eastwards of this stream, and that both consist of the same minerals, and are none other than parts of one and the same chain of mountains.

The geographer, adhering to his geographical standpoint, will then draw two lines, one through the Indus valley and one through the Hunza valley, which both indicate the limits between mountain systems. Nevertheless there is a very great difference between the two valleys. The Indus flows for a great distance through a mighty longitudinal Tertiary dividing line, which owes its origin to a tectonic movement of the Earth's crust; the Hunza, on the other hand, flows through a transverse gorge which the river, if not altogether, at least for the greater part, has made for itself through the Karakoram chain. As regards the Indus the geologist will, in my opinion, have to give in slightly, and as regards the Hunza the geographer will have to concede. It will be easy in the

former case for the geologist, because he too may consider the Indus valley as a very striking geological phenomenon; while in the latter case the geographer will readily admit that the accidental presence of a river valley is no reason for adding a part of the Karakoram to another mountain range to which it does not actually belong.

One of the chief points of the discussion, whether the Karakoram should actually be counted to the Himalaya, or whether one should speak, as Major Mason proposes, of the Karakoram–Himalaya. But, I would ask, does this not unnecessarily complicate the matter? Has then the Kunlun, which is no less connected with the Karakoram than the Karakoram with the Himalaya (I would almost say that the opposite is the case) not equally as much right to be comprehended in that great Central Asian Complex? And why then should one wish to cut off the Muztagh Ata? Both through study of the map and also during our expedition of the past year across the mountains from south to north, I was very strongly impressed by the fact that here are several systems distinctly separated from each other, against which separation on the map the geologist would presumably raise no objections. As a geographer I have the feeling that the linking of the popular name Himalaya with that of the Karakoram is really more of a concession to the laity. I discussed this subject with some English people in India. They told me: "For us all those mountains in the north are the Himalaya mountains." For that assurance I need not have gone to India, for every compatriot of mine knows the name Himalaya, but how many are there who have heard of the name Karakoram? When I wrote my work on our first Karakoram Expedition, I chose Karakoram as the title, but my publisher insisted on having it coupled with the name Himalaya, but he did not do so because of geographical considerations. I cannot of course judge the motives of Sir Martin Conway when he sought a title for his book on his explorations in the Karakoram, but I should say that in 1892 a title which included the name of Himalaya was an absolute necessity for the public. For the geographer that necessity does not exist, or does so no longer, and in the long run the laity will follow the geographer in such questions.

As regards a south–north division, I myself had thought of the following: Himalaya System; Karakoram System; Aghil System; Kunlun System.

As to the boundary lines, I hope to have an opportunity of publishing something later on, as part of our explorations of the past year and part of that of the coming year are bound up with the determination of these limits. Already however I would name the Indus valley as the dividing line between the Himalaya and the Karakoram, a division which our geologist, Dr. Wyss, considers wholly acceptable. The northern boundary of the Karakoram System would run along the Shaksgam valley and partly along the Upper Shyok, where Dr. Wyss found the same geological formations as in the regions eastward of the Karakoram pass, which we explored.

With regard to the westerly and easterly limits of the systems, these should also be studied on a map comprising the whole of Central Asia. About the Himalaya System there will not be much difference of opinion. With the Karakoram System it is quite a different matter. Exploration has certainly advanced so far that the easterly limit can now be determined. On looking at the map of Ladakh one is inclined to have the main chain terminated by the

Shyok valley, but on looking at the map of Central Asia I feel very doubtful, and I believe that the question in the future will not read: "Where should we draw the eastern limit of the Karakoram?" but: "Where does the dividing line run between Karakoram and Trans-Himalaya?" Here I step already into the sphere of the nomenclature. Trans-Himalaya is the name geographers recognize. For the rest it seems to me that there should be no objection to including the Trans-Himalaya, if necessary, in the Karakoram System.

I believe there is more to be said with certainty about the western boundary. At the beginning of this paper I stated that I considered the mountains to the west of the Hunza river as belonging to the Karakoram, both geographically and geologically. Major Mason, if I remember rightly, does not share my opinion, but includes that chain of mountains in the Hindu Kush. Sir Sidney Burrard and Dr. Longstaff do not express a definite opinion in favour of the Hunza gorge as the boundary between Karakoram and Hindu Kush, but merely state that it is difficult to determine a limit. Longstaff says: ". . Standing on any height between Gilgit and Hunza I have found it extremely difficult to visualize where the Karakoram ends and the Hindu Kush begins."

Now the regions mentioned here were visited by us in 1925, in part at least, and by virtue of these explorations I came to the conclusion that the main chains of Karakoram and Hindu Kush in no wise lapse into each other, nay run alongside for a part. The Karakoram terminates immediately south of the point where the southern arm of the Batura valley begins. From that point onwards the ridge descends to the valley and does not continue in the main chain of the Hindu Kush. Even the chain which forms the northern limit of the Batura does not do so. The main chain of the Hindu Kush distinctly terminates, in my opinion, to the north of the Chapursan river. I have mentioned the Aghil region as a separate unit because there we have to do with a sedimentary mountain chain between the crystalline groups of Karakoram and Kunlun, while in my opinion a distinct geographical division is also possible.

As far as the nomenclature is concerned I am in agreement for a great part with the views of Major Mason. I fully realize that one should preserve the old historic names wherever possible, be it alone for the sake of the travellers who explored the Central Asian Highlands in years gone by. On the other hand, there should be no hesitation in handling alterations which serve to prevent labouring on further on a faulty basis. I hope that at the same time the different demands made upon names will be kept in view. In my opinion the inhabitants of the regions can only be interested in the names of the details. The names employed for the principal division will be chiefly of service to geographers and geologists. I therefore consider that it is immaterial whether the name Karakoram is known to the inhabitants in Hunza or not. Supposing they give another name to the Karakoram, as they are acquainted with it there, then that name would very well be given to that group, just as the Bernese Oberland is a group name in the Alps. I therefore hope that if subsequently it should prove that one of the chains to the east of the Shyok river is a continuation of the Karakoram, there will be no hesitation in including those mountains in the Karakoram System, no matter how the inhabitants of one or other of the valleys may denote those mountains. The giving of the name Karakoram is exclusively of interest to geographers, but to them it is vital. In that region

one should also be free to give a local name to one or more subdivisions (groups). At times I ask myself whether too much importance is not attached to a local name, for in some instances the inhabitants of several valleys have different names for one and the same mountain.

In the discussions already held the significance of the word Karakoram was also considered. It is regrettable that owing to an unfortunate concurrence of circumstances this name was given to one of the most magnificent snow chains of the Earth. Now that not only are the mountains known by the name of Karakoram but the name itself has obtained a trustworthy sound amongst travellers and geographers, I hope that an alteration therein will never be thought of again. That the outward appearance of the mountains bears no resemblance to its name cannot be an objection, to my mind. I might quote numerous similar instances. So one might ask why one of the least snowy mountain peaks in the vicinity of the Zermatt should be called Dent Blanche and why the base of the Mont Blanc should have been given the name of Aiguille du Gouter, for with the widest stretch of imagination it would never call to mind an "Aiguille."

When I discussed above the division of the Central Asian mountains, I put forward four mountain systems, which should simply bear the names of Himalaya, Karakoram, Aghil, and Kunlun. On the grounds already mentioned I would not advise the combination Karakoram–Himalaya, for to be consistent one would then have to add the word Himalaya to the names of the other systems as well.

In a division and subdivision of the mountain systems and the giving of names thereto one is involuntarily inclined to try to draw a parallel between these systems and the Alps, the best studied and subdivided mountains of the world, although even there the conflict over a practical division is not yet decided. The Alps are first divided into two halves, the East and West Alps (some geographers divide them into three parts). These great divisions are sub-divided into Alp groups, and the Alp groups into mountain groups, which on the whole are pretty clearly distinguished from each other. Now in the Karakoram, for instance, we at once notice a striking difference from the Alps. The Alps together form one vast entity, while the Karakoram System appears to be composed of mountain chains which in one or more places are most closely connected with the main chain. This difference in build however cannot, in my opinion, afford the slightest reason for deviating from the tested system of division of the Alps. If we apply this system to the Karakoram we necessarily arrive at practically the same results as Major Mason. Neither geologically nor geographically would it be justifiable in my opinion to consider the Kailas range as a separate range of mountains. No one who has seen even once only either the Hispar or the Siachen glacial region would allow these manifestly united mighty complexes to be separated. It stands to reason that the necessary outcome of that would be that we should have to consider the apparently so strongly individual chains east and west of the Nubra river as belonging to the same mountain system. The geographer however who casts his eye upon a carefully drawn map of sufficiently large scale will speedily be satisfied with this division, sooner at least than the traveller, who is misled by the enormous width of the Nubra valley.

The denomination of Kailas-Karakoram, etc., of Mason I indeed find both logical and practical. Geologically and, as far as I can gather from the material at my disposal here, geographically also, one may speak of the Ladakh-Karakoram, while I myself reckon the so closely united Sarikol chain with the Karakoram (I visited the immense binding knot in 1925). The denominations Kailas-Karakoram, Ladakh-Karakoram thus become equivalent to the denominations Pennine Alps, Bernese Alps, etc. There is, in my opinion, not a single objection against further applying this manner of nomenclature even to vast and striking parts of the Karakoram main chain, so that we might speak of Muztagh-Karakoram, Hunza-Karakoram, Nubra-Karakoram, etc. In order to have unity in the system of nomenclature it would, in my opinion, be advisable to alter the name of Zaskar range into Zaskar-Himalaya.

One exception I would like to make with regard to Mason's Aghil-Karakoram. From the rock specimens which the Mason Expedition brought back and the photographs which he issued, it is almost certain that in the Aghil range we have a geological formation which fully agrees with those of the mountains east of the Upper Shyok and the mountainous regions east and west of the Karakoram pass. Thus here an extensive sedimentary region exists, geologically differing entirely from Karakoram and Kunlun, from which it also deviates morphologically, while geographically it may be very distinctly outlined without being forced at all.

Just as in the Alps the Alp groups are further subdivided into mountain groups, so one can here do the same with the Karakoram groups. As an arbitrary example I would mention the Nubra-Karakoram, which could be subdivided into a Kondum group, a Saser group, etc. For the present however one will have to look exclusively at the wood and not at the trees. Only, once again, let the wood extend farther than the map of Ladakh!

NOMENCLATURE IN THE KARAKORAM: *A paper read at the Afternoon Meeting of the Society on 12 May 1930, by*

MAJOR KENNETH MASON

THE title announced for this discussion was "Nomenclature in the Himalaya." This was perhaps a little misleading for two reasons. In the first place there is undoubtedly some difference of opinion as to what comprises the Himalaya—where they begin and where they end—and how far north they extend. In the second place, it seems to me quite useless to discuss the nomenclature of a region without first considering its physical features. This is especially necessary in the Karakoram region because it is only in the last three years that the results of all modern surveys of this region, dating since Longstaff's discoveries of 1909, have been incorporated on our Survey of India maps, and even now some of these maps are not available to the public.

People have written to me during the last few months giving me their views, yet admitting at the same time that they "have not been able to refer to modern maps." Others seem to have assumed that the old maps of the Karakoram region made by the Survey of India during the early 'sixties of last century were made with the same accuracy as those of the nearer ranges of the Himalaya, regardless of the facts that they were done under special and often hurried circumstances, and that our surveyors were instructed not to waste time surveying barren land above an altitude of 15,000 feet. I hope to convince some of you this evening that we know more about the mountains of the Karakoram to-day than did our predecessors of seventy years ago; and that this knowledge forces us to modify the views then held.

The region concerned is bounded on the south by the trough of the Indus–Shyok, which is roughly parallel to the Ladakh range; and this range is itself parallel to the axis of the Great Himalaya. These two great ranges have been traced out by Sir Sidney Burrard in considerable detail in his 'Sketch of the Geography and Geology of the Himalaya Mountains and Tibet,' and though there are still considerable blanks in our knowledge of the details of these two ranges, there is nothing controversial in their general alignments. Sir Sidney Burrard traces both of them from the Indus on the west to the Brahmaputra on the east, and names them on the frontispiece to his 'Geography,' the "Great Himalayan Range" and the "Ladakh Range" throughout their lengths.

On the west of the Indus there are some difficulties in tracing their extensions; and Colonel Morshead, Kingdon Ward and others have discussed the possible extension of the Himalayan ranges east of the Tsangpo gorge. Morshead writes: "Does the Great Himalayan Range turn suddenly northwards through Gyala Peri and Makandro, or does it maintain its easterly direction with diminishing elevation through the satellite peak of Sanglung (23,018 feet), subsequently perhaps resuming its existence in the unexplored regions of Poyul?" And he goes on to say that the topographical evidence is incomplete, and that the problem is one which demands geological as well as further geographical investigation. These questions do not concern us here, and I only mention them as showing that such problems exist.

North of the Indus–Shyok trough, the parallelism of the ranges with the

Great Himalaya and Ladakh ranges is not evident. In Burrard's 'Geography' he shows two ranges—the Kailas and the Karakoram—from about longitude 72° to 78°, approximately parallel to the Ladakh range. With a break from 78° to 80° the Kailas range is continued parallel to the Ladakh range through the sacred mountain of Kailas and onwards to longitude 92°. The Karakoram range is shown parallel to this and, with a smaller break near longitude 80°, is continued across the Tibetan plateau, though diverging northwards out of true parallelism. East of longitude 79° this northern range is given no name. I understand that since the book was published in 1907 Sir Sidney Burrard's views have been modified and that he no longer considers that the mountain Aling Kangri is on the main Karakoram alignment.

It was, I think, very natural in 1907 to show the northern ranges parallel to those of the south. The extraordinary parallelism of the southern ranges was a powerful argument in favour of this theory, and we were perhaps rather inclined to emphasize this parallelism in the drawing offices. This has resulted in the Kailas range being continued across the two deep valleys of the upper Shyok and Nubra, in a direction almost at right angles to the visible direction of the ranges.

The name "Karakoram" has undergone some curious contortions. There is no doubt whatever that in this region it originally belonged to the pass, and that it is confined by the traders to the pass to-day. From this pass it was first given generally to the unexplored watershed between the Tarim basin and the Indus drainage; and so was carried westward along the watershed to the great range of snowy peaks, known to the traders at that time and to-day as "Muztagh," or Ice-mountains. I wish to emphasize this point: that the name "Karakoram," however well known it may be for the pass, is not now and never has been given to these mountain ranges by any one but Europeans. All the traders in these parts use descriptive names for localities. "Muztagh" is the word they use descriptively to denote ice-mountains, and I am quite prepared to believe that where Turki is spoken there are other Muztaghs, just as there are other Karakorams. In the small vocabulary of illiterate people there must be repetition. But "Karakoram" is used for the disintegrated regions below the snow-line; "Muztagh" for the mountains that rise above that line. The Karakoram pass is below the snow-line. The southern disintegrated slopes of Muztagh Ata—the father of Ice-mountains—are known as "Karakoram" below the snow-line. The fact that Muztagh Ata does not lie on the range we are discussing has been used as an argument against the range name "Muztagh." The same argument must surely apply to "Karakoram."

Since the word "Karakoram" was first applied by Europeans to the watershed range, there has been a great accumulation of knowledge. Sir Sidney Burrard tells me that early in the last century the Kunlun and the Karakoram were considered one range. Hayward, who first explored the upper Yarkand tributaries—though he did not reach the sources—separated the Kunlun from the southern ranges, or rather from a single southern range, which he called "the Muztagh or Karakoram"—"Muztagh" being the name given him by the traders, and "Karakoram" the name then coming into use among Europeans. On his map he showed tributaries from this single range flowing northwards into the Yarkand river. It was Sir Francis Younghusband who, in 1887, first dis-

covered the Aghil range which lies north of the main Muztagh range, and south of the Kunlun.

Meanwhile the surveys from the south, based on triangulation, had not reached the main watershed in the region of ice, though the limit of the surveys was believed to be the watershed and was shown so on maps. Burrard, in the frontispiece to his 'Geography,' naturally showed the Karakoram range according to this supposed watershed-alignment north of and only some 15 miles up the Siachen glacier, and, continuing it parallel to the Ladakh range, he took it across the upper Shyok, and not through the Karakoram pass. For some reason I cannot trace, the small-scale maps of about the same date (and until the war) showed the name "Karakoram" bending north-eastwards to the Karakoram pass, and not according to Burrard. On Survey of India maps, published after the war, owing to Colonel Wauhope's views, the name "Karakoram" was made to neglect the Karakoram pass, and was brought the whole way down the watershed between the upper Shyok and Nubra, thus cutting the alignment of the Kailas range, as shown on small-scale maps, completely in two.

During the last few years all these maps have been redrawn by the Survey of India, and we have included the many valuable surveys carried out by private explorers, with several of whose expeditions the Survey of India has attached trained surveyors. But neither the explorers nor the surveyors have brought back any names for the ranges, and they have used the term "Karakoram" more and more loosely. When drawing the maps we have been placed in the difficulty of putting the old range names along the alignments as surveyed in detail. For we find that the alignment of the names as handed down to us does not agree with the alignment of the ranges as surveyed.

A few years ago I layered a map on the 1:1,000,000 scale, on which I had put all modern surveys and heights. As far as possible I persuaded travellers to fill in the gaps in our knowledge, and when they came back, I put their results on to this rough map of mine. After my own expedition in 1926 I made another layered map, and during my spare time during the last few months I have made a third which you see before you.* This is layer-coloured as follows:

12–14,000 feet	dark green
14–16,000 „	light green
16–18,000 „	yellow
18–20,000 „	pink
Over 20,000 feet	dark red

I do not want to emphasize the fact that all the country shown yellow, pink, or red is at least 1000 feet above the area the old surveyors were required to survey rigorously; because some, notably Godwin-Austen, paid little attention to that instruction. But this map shows clearly how much more we now know of the physical features of the region under discussion. It includes the surveys done during the Visser expedition of last year, and I have left blank the area of guesswork which I hope the Vissers will fill in this summer.

I have not added much original exploration myself to this great region; but I have examined a great deal of it on the ground; I have read and re-read the

*This map is in process of fair-drawing and will be laid in proof state before the proposed conference.—Ed. *G.J.*

descriptions of, I believe, all travellers who have visited it; and I have interviewed many of them personally. I have therefore often been consulted by the officers in charge of the drawing and reproduction of our maps of this region in India concerning the application of the range names.

I find that very few travellers in their writings have in recent years used the term "Karakoram" in the same sense, and no two existing maps drawn by different offices show the name "Karakoram range" on the same alignment, The views of our past experts in the Survey of India are not identical, as is natural when one considers that they studied material that was constantly becoming more accurate. But I have seen no published map that brings out the salient features of the area so well as this one.

The one important feature that "hits the eye" is the great Nubra–Siachen trough, at one time filled by a great glacier from its northernmost point (nearly 30 miles north of the watershed shown on the old maps) right down to its junction with the Shyok. This trough appears to be a prolongation of the Shyok itself, and there are indications of it having once continued by the Urdok glacier into the Shaksgam.

Next to this feature we see the great mass of the main snowy range. From K_2 it passes the Gasherbrum group, cuts across the Urdok–Siachen trough, and passing the Teram Kangri group, continues down to the Saser pass and the great peaks of the Nubra–Shyok divide.

The third feature is the Rimo–Upper-Shyok trough, east of which—especially towards the south—surveys are less detailed and not accurately contoured.

The Hushe and Kondus areas and those south of Masherbrum I have left uncoloured, because we have no contours and insufficient heights to go upon. There are undoubtedly great groups of peaks, but it is extremely difficult to place them in any range alignment.

North of the Gasherbrum–Teram Kangri ridge lies the Shaksgam and the ranges of the Aghil—rocky and difficult, but not continuously above the snow-line; and eastwards of them the comparatively insignificant Central Asian watershed by the Karakoram pass, easy to cross at all times of the year and petering out on the Kushku Maidan, the Aksai Chin, and the Lingzitang. On this last insignificant feature lies the Karakoram pass.

Our difficulty is to name these features on the map. On the main alignment of ice-covered peaks, known to the only people who see it as Muztagh, we have two well-known, though little-used passes, both called "Muztagh," and we have the well-known Saser pass on it farther south. The range, when only one was known, was called "the Muztagh or Karakoram" range by several of our predecessors. If therefore we give a range-name to this great alignment of ice-mountains, it seems, in my opinion, only right to call it the Muztagh range. And the name has the advantage that it would be understood by all traders using the trade route. If we decide to name the watershed and ignore the great Saser mountains, we may write Karakoram range along that insignificant watershed and extend it to the ice-mountains farther west. But since Turki names are all descriptive, I believe we shall never get the trader to follow suit. Muztagh is *their* traditional name, and they do not use our maps.

Whichever we do, we are faced with the problem of the southern range of the Karakoram. Sir Sidney Burrard (following, I believe, Alexander Cunning-

ham) placed the name "Kailas" along it. If we adopt Wauhope's alignment for the "Karakoram range," we cut this "Karakoram Kailas" off from its very problematical eastern extensions which are the only excuses for its name. I do not know from personal observation either the sacred Kailas north of Manasarowar or the Lesser Kanawar Kailas, but they exist and are well known to Hindus. Must we add a third Kailas, which is not Hindu, has nothing in common with either of them, and is, as Dr. Longstaff holds, much more closely allied to the Karakoram range?

North of the main watershed we have the Aghil mountains, which, in my opinion, are also very closely allied to the main Muztagh range. I doubt whether they are anything more than parallel outer ranges of that main range. Their parallelism is very marked. But they introduce us to an entirely different region—a region of disintegrated rock, red marbles, black limestones, and sandstones and shales, containing Jurassic fossils, and lastly red sandstone. It is a region of little rainfall compared with the main range, Tibetan in climate, and with Tibetan fauna and flora.

All these ranges have been included by various travellers in the Karakoram area, yet the same parts have been called by different travellers "Eastern Karakoram," "Western Karakoram," and merely "Karakoram." Sir Sidney Burrard advocated stopping the name "Karakoram" westwards at the Hunza river, the alignment farther west being denoted by the name "Hindu Kush," and this plan seems by far the best to adopt, though a recent traveller included the mountains bordering the Batura glacier in the Karakoram system. In searching for some sort of order in applying the range names to this area, I concluded that it would be best to call the whole region bounded by the Hunza river, the Indus, the Shyok, and the Raskam–Yarkand rivers "the Karakoram Himalaya," and to define the separate ranges by the names "Kailas," "Muztagh," and "Aghil." To distinguish the Kailas range from the others of the same name, I proposed to add "Karakoram" to it, and to indicate the grouping of all three ranges as a unit, I proposed to do the same with the other two.

These views were published as long ago as 1927 in the *Geographical Journal* and raised no protest. Before reprinting them in a Survey of India publication two years later, I naturally placed them before the Surveyor-General of India, who agreed that as so many explorers and geographers interested were resident in England, it would be well to ascertain their views with the aid of this Society.

The nomenclature I proposed was the best I could find that would introduce some systematic nomenclature out of the existing chaos. I do not believe "Karakoram" is a correct name to use descriptively for a mountain range, which lies throughout its length above the snow-line, but it suits a mountain region. I have tried to compromise by giving it definitely to the region, where it has more and more in latter years been applied.

If we retain "Kailas" for the southern range, I see no alternative but to distinguish it from other Kailases by adding the word "Karakoram." Similarly, if we use the word "Muztagh" we should use the name compounded with "Karakoram," to distinguish it from other Muztaghs: and if the Aghils are accepted in the Karakoram region, I see no objection to them following the same system.

I am not in love with compound names, but I fail to see why they are considered unsuitable. Muztagh-Karakoram is no more cumbersome than

Bernese Alps or Nepal Himalaya. I have been using these compounds of mine for three years now and find no difficulty or objection to them, whereas I found the previous nomenclature most awkward.

There remains the solution proposed by Dr. Longstaff. He wishes to abolish Kailas from this region altogether. I agree with him in that. As I understand him, he intends to stick to the name "Karakoram" for the region but to name no ranges, except on small-scale geographical maps. On topographical maps he would label the mountains by groups. This system has many points to recommend it, but is it not rather more complicated than the system I have proposed?

DISCUSSION

Before the paper the PRESIDENT (Colonel Sir CHARLES CLOSE) said: Major Kenneth Mason is going to give us a paper on the nomenclature of the Himalaya. That paper depends chiefly on new information which most of us, in fact, have not got, information which has been derived from the labours of recent explorers and the work of the Survey of India. Major Mason is a distinguished officer of the Survey of India, and it is on that new information that his paper will depend.

This question of nomenclature is one which has been disputed from time to time, but we always feel that it would be very advantageous if general agreement could be come to as to the names of Himalayan ranges, passes and so on, especially for the benefit of those who use maps. I have looked up the subject of this paper in the beautiful atlas of the Italian Touring Club and find it difficult to follow the paper, the reason being that much of the information is new. We are anxious to hear Major Mason, so I will not detain you any longer, but ask him to begin.

Major Mason then read the paper printed above, and a discussion followed.

The PRESIDENT: We are very glad that Sir Sidney Burrard was able to attend, and we should like to hear what he has to say on this subject; he has been quoted a good deal during the course of the lecture.

Sir SIDNEY BURRARD: Nature has provided Tibet with three primary ranges: Himalaya on the south, Kunlun on the north, and Karakoram the central backbone. I ask the Royal Geographical Society to save this primary classification. It is impossible to discuss secondary ranges and names until the primary foundation is fixed.

The Royal Geographical Society has always upheld the principle that geographical names should be chosen in the interests of the people of the country. May I ask this question: Who are the people whom this meeting has to consider? West Tibet abuts against Chinese Turkistan on the north. The Karakoram mountains stand in Tibet. The Tibetan population live on the south side of the range; the northern side is uninhabited. By the last census there are 178,000 residents who speak the Tibetan dialects. The number who speak Turkistani is less than 1000. So when I ask who are the people, the answer is: The Tibetans, not the Turkistanis.

Our old explorers, who explored the Indus valley south of the mountains, always brought back the name Karakoram for the mountains. Those few who went north of the mountains brought back the name Muztagh. The Tibetan pundits use Karakoram; the traders from Turkistan say Muztagh. Similar divergencies are to be heard in India. Afghan traders and Tibetans come into India in the winter, and if we ask them about mountain names, they do not agree with the Indians.

Major Mason has contended that the British explorers took the name Kara-

koram from the pass and gave it to the mountains; he argues that the name Karakoram mountains is a British introduction. He has produced no evidence of this. I ask him to produce his evidence. For it is upon this that he has condemned the name Karakoram. As far as I know, all evidence goes to show that the name was given both to the pass and the mountains long before British explorers went there. We cannot tell how the name originated. It is not a Tibetan word. Throughout history the Afghans have cherished the name Hindu Kush for their mountains, but neither of the words "Hindu" or "Kush" are Afghan. The history of Tibet is unknown. Marco Polo gave us one short glimpse into the past. In 1300 A.D. he said: "Tibet belongs to the Mongolian Khan." So conditions were different. The Mongolian capital was Karakoram, and, by a coincidence, the road over our Karakoram pass was the Karakoram road from India. This is no proof of the origin of the name, but it shows how unsafe it is to speculate about origins. We only know this, that the present Tibetan population has been slowly absorbing the name.

Moorcroft was our first explorer to introduce the name "Karakoram mountains" into modern geography. He did not go to the Karakoram pass. May I read you one sentence from his diary dated from Tibet, 1820: "Although I am unable to visit the countries which intervene between Kashmir and the Karakoram Mountains we had frequent opportunities of communicating with the natives of those regions and gained from them various notices which may not be unacceptable. It appears that those countries which lie along the foot of the Karakoram Mountains are . . ." and then he gives a list of names which is to-day quite correct.

Having read Moorcroft's diary I cannot believe that its author took the name from the pass and gave it, of his own initiative, to an immense mountain chain, without saying that he had done so.

In 1846 Cunningham followed in Moorcroft's tracks. He explored the south side of the Karakoram. He found the name applied to the mountains. It never entered his head that this name had been given to the range by the previous explorer.

Cunningham was followed in 1855 by Montgomerie, who spent ten years in triangulating Tibet and who had numerous observers over the country. Members of his party heard the name Muztagh used near the Tibet border and amongst their Turkistani followers, but they heard the name Karakoram in use on the south side. In those ten years no member of this large party ever suggested that the name Karakoram had been given to the mountains by British explorers. Mason wishes to introduce Muztagh, but he is doing the Turkistanis no service, for we have already given this name of theirs to the highest mountain of Southern Turkistan, and Stein has named the range of Western Turkistan the Muztagh Ata range.

Major Mason wishes also to introduce the compound name Karakoram-Himalaya into Tibet. In 1847 Cunningham gave a simple definition which fitted the ancient Sanskrit name into modern science. His definition was this: "The Himalaya Mountains form a natural boundary between India and Tibet." The Royal Geographical Society and the Survey of India have accepted this definition. Three presidents of the Royal Geographical Society have laid down that the name Himalaya should not be extended across the Indus into Tibet. The Indian Survey has never taken the name into Tibet. Colonel Ryder observed many high peaks in South-Eastern Tibet, but he never spoke of the Lhasa Himalaya. Sir Aurel Stein never spoke of the Kunlun Himalaya.

The Linguistic Survey of India has shown that there are races of men like the Gurkhas who are Himalayan and who are neither Indian nor Tibetan nor half-

breeds. The geologists also have their Himalayan zone and their Tibetan zone. Our geographical sub-division of Tibet ought to provide a basis for other branches of science

In every science there must be uncertainty when we pass the limits of exploration. But uncertainty need not mean confusion. To introduce such a name as Karakoram-Himalaya must lead to confusion, as it destroys the individuality of both the primary names. The double names will not be acceptable to other branches of science. And when you consider that this double name Karakoram-Himalaya is to be connected in Tibet with another new double name, Muztagh-Karakoram, surely you cannot agree to place such an unfair incubus upon the Tibetan people.

Sir FRANCIS YOUNGHUSBAND: I must confess I should like that part about the Muztagh pass to be called the Muztagh-Himalaya. When I went across in 1887 the name Muztagh pass was known and the natives used to speak of the mountains which that pass crossed as the Muztagh mountains. I have always disliked the name "black gravel"—for that is what Karakoram means—applied to those exceedingly high and snowy peaks where there is no black gravel at all, whereas one can understand the region about the Karakoram pass and the region to the east being called Karakoram because it is nearly all disintegrated mountain. I would certainly support Major Mason's views and say that when you go to that region round K_2 you are going to the Muztagh-Karakoram.

As regards the name Aghil range, I named that myself after the Aghil pass. When I went across there the people called the pass the Aghil Dawan. I applied the name of the pass to the range. And Aghil range has been accepted as the name of that range and is generally acceptable. As I say, I should like, for my part, to support Major Mason.

Dr. T. G. LONGSTAFF: What we want is simply to try and find out what is the most convenient nomenclature. Of course the whole thing is a mere convention. We did not make the mountains. We found them there and, having found them there, in order to describe them we want to place labels on them.

Some of those present may have read what I wrote in the *Geographical Journal* in January 1930 (vol. 75, p. 44), and I think I may possibly have influenced Major Mason in suggesting the use of the label Karakoram-Himalaya. I have since realized that there are grave objections to the name Karakoram-Himalaya, and so far I should think we probably see eye to eye with my respected friend, Sir Sidney Burrard. I recommend the name Muztagh-Karakoram for the whole mountain complex.

Let me now endeavour to clear up the question of names. As to Karakoram, you will find in most books and gazetteers that Karakoram is stated to be the capital of the empire of Chingiz Khan, about 1000 miles from the Karakoram pass. Various authorities translate the word "Karakoram" as "black gravel," or "black rocks"—more probably it means black screes. If Sir Sidney Burrard will pardon me, I should like to say that Karakoram is just as much Turki as Muztagh.

Sir SIDNEY BURRARD: But it is adopted by the Tibetans, whereas Muztagh is not.

Dr. LONGSTAFF: Well, sir, with respect, I think that Tibetans never use that pass, and there must be very few Tibetans who use Turki words. Furthermore, they never use the word Kailas. Sometimes they call it Tise; sometimes Kang-ri Rimpoche, which means the sacred ice mountain, or lord ice mountain. The names Karakoram and Muztagh are both descriptive and both used in many places. There must be Central Asian travellers here. How many Aktash do they know? Where there is a white rock, that place is called Aktash. How many Kizil Rabat?

I am very keen on the historical side of this question. The first man whose writings are of practical interest to the mountaineer is G. T. Vigne, who in 1835—ninety-five years ago—was the first European to penetrate up the glaciers. I have here a map of his journey ninety-five years ago, and he speaks of the Muztagh. He went up to the Saltoro pass that Sir Francis Younghusband went to look for in 1888. Vigne puts "Mustak" on his map for the main axis of the complex and "Kara Kurum" in smaller letters beside the "Pass to Yarkund," quite correctly indicating that the pass does not lie across the main axis of elevation (*vide G.J.*, 69, 1927, p. 329).

Sir SIDNEY BURRARD: It depends who he got his information from, whether Tibetan or Turkistan.

Dr. LONGSTAFF: From Baltistan. He went up from Khapalu to the Saltoro pass. When I went to Khapalu to ask about Vigne's route Rajah Shere Ali Khan was quite familiar with the name Saltoro pass (*G.J.*, 35, 1910, p. 624).

Up to 1890 Vigne's was the best map there was of the centre of the map now shown by Major Mason. Before Major Mason, Wood, De Filippi, the Vissers, or myself had made any explorations there Vigne's map showed the Saltoro pass marked on the right place. As a matter of fact, Slingsby, Arthur Neve, and I were the first Europeans to get to it. I have here also the map (1890) illustrating the explorations of "Captain F. E. Younghusband, King's Dragoon Guards, in 1888." On this is shown the Saltoro pass with the head of the Saltoro valley—all correct. Now why has that name been expunged from the latest maps? It starts historically in 1835; it was so well known that Colonel Younghusband went to look for it in 1888, and we went and crossed it in 1909.

The PRESIDENT: Who changed it?

Dr. LONGSTAFF: Why, sir, the Survey of India. I said in my paper (*G.J.*, 35, 1910, p. 627) that I knew that quite locally the people called the glacier Bilafond and they called the pass Bilafond La; but Shere Ali Khan called it the Saltoro pass and the maps called it the Saltoro pass until the Bullock Workmans changed it and were followed by the G.T.S. You have really not a better authority than Vigne, the man who went to the Saltoro pass in 1835. Also it is the only *important* pass into or out of the Saltoro valley.

But to return to Muztagh-Karakoram: the trouble is that it is really necessary to have two systems of nomenclature (*G.J.*, 75, 1930, p. 44): a system for maps which are on a small enough scale to show the relationship with other ranges, so that you can get a sort of schematic idea, and then what I call a local system, such as we require in the Alps, a topographical system of nomenclature of different ranges. You see I am withdrawing altogether the suggestion Karakoram-Himalaya which I made earlier (*G.J.*, 69, 1927, p. 330). I think Major Mason has very kindly not exposed me to the extent he might have done. I see Sir Sidney Burrard's point. I think he is absolutely right. The difference between the Himalaya and the Karakoram is so great that it would be a pity to mix them up. On historic grounds and on descriptive grounds I would like to see the word Muztagh restored, thus on further consideration going back on another suggestion of mine (*G.J.*, 75, 1927, p. 45).

One of my treasured volumes is a paper by Godwin-Austen of his travels in 1861 in the "Mustakh" range (*J.R.G.S.*, 34, 1864). As far as I know it is the first account of the actual glaciers, except for Vigne's visit to the Saltoro glaciers and Henry Strachey's visit to the lower Siachen glacier in 1848; but no one spent the time on the glaciers which Godwin-Austen did. He always called it the Muztagh range. So I think that with these really very authoritative usages respect for the historical record fully justifies the retention of the name Muztagh. If it were a case of voting I should vote for calling the whole complex between the

Hunza–Gilgit river, at any rate down to the Nubra Shyok, the Muztagh-Karakoram. I should like to see both elements of that nomenclature preserved. We must remember that our previous ideas of the structure of this range were not correct. Major Mason's map shows you that there is a definite continuous range from K_2 running diagonally past that big white patch that Major Mason has left blank, down to the great bend of the Shyok river. I know that range myself—of course not all of it—and I particularly know the Nubra Shyok end of it. From the top of the map before us down to the very centre and below the centre, it is one continuous range of enormous peaks. There is no known crossing of the range by anybody for the entire length of that diagonal curve across the map except across the Saser pass. Younghusband's Saddle is up at the head of the Siachen glacier, and there is possibly a passage for travellers from the Siachen to the Rimo glacier, which I hope Dainelli will manage this summer. But there is absolutely a continuous range. It does not fit in with the old lines. I cannot approve the bottom part of it being connected by name with Kailas because it really has no connection. I also know the Tibetan Kailas well, and it really has no connection with it. I therefore suggest that for the entire complex of the system that we are speaking of there is good historical tradition and warrant for reviving Vigne 1835, Godwin-Austen 1864—I do not think he has had the credit due to him—and that we should call the whole complex the Muztagh-Karakoram. There will also be this advantage: that in small-scale maps for which it will particularly be used, Muztagh-Karakoram being written from left to right, the word "Muztagh" will come on the west and the word "Karakoram" on the east, and will connect naturally and remind one of the Karakoram pass, but I cannot insist too strongly, as I did here twenty years ago, that the Karakoram pass has not got any vital connection with the mountains that we are discussing, and I wish also to insist that any system of names used is merely a human convention of convenience, and nothing else. But do respect history and the nomenclature of early travellers.

As regards the parallelism to which I drew attention in the *Geographical Journal* for June, 1910 (vol. 35, p. 625), I wish again to draw attention to those four rivers, the Shyok, the Nubra, the Shiggar, and the Gilgit, all flowing backwards round the corner. They all must be really tectonic valleys; they cannot be valleys that have been excavated by glaciers, because they are the wrong way; they are scratched by glaciers; smoothed by glaciers; straightened by glaciers; but they look to me to be due to original tectonic folding. The Nubra and the Shyok flow down from the north-west to south-east and join a river which is flowing north-west. The Shiggar river does the same; and the Gilgit also. So that our old conception of the ranges being parallel to the Indus does not work when we are on the ground, because elevation has taken place in two directions. It looks as if the original line of elevation may have been, roughly, an east-to-west elevation which was then crossed by cracking along a north-west to south-east direction, so that there is a criss-cross pattern. No map has ever been made that shows so clearly as this one of Major Mason's that from K_2 to the end of the bend of the Shyok there is an absolutely continuous range of mountains with only one pass, and that a glacier pass of 17,600 feet, namely the Saser, the lowest of all, and then, beyond to the north-west, the mountains run on beyond Hispar to Dasto Ghil, where the Vissers were, and right up to what is taken as the junction with the Hindu Kush. For the whole complex I do not think you can do better than use the label Muztagh-Karakoram.

I forgot to mention that I agree with De Filippi on the spellings Shayok and Rimu, and hope these will be seriously reconsidered.

Colonel C. H. D. Ryder: There are only two points I would like to make, one is that in making any change in the names in the area under discussion I hope

every one will be very careful. It is very much a No-man's land and the frontier has never been demarcated, and thus when applying names it is well to be very careful that you do not push, we will say, a name from Turkistan too far south, or push a name from Ladakh and that side too far north. The people, and even the Governments, of those or any other wild parts are very much inclined to attach great importance to a name when they are trying to claim more territory than they are really entitled to.

The other point is that I am always very much of a conservative, and the fact that a name has been current in a certain way for sixty years makes me feel very disinclined to go back to a name that may have been current before. It may even be a better one, but it would be very hard on those who have to learn geography if we in this room, a geographical society or any body like that, were to change a name unnecessarily. Once a name is given to a place for good or bad, I honestly think it requires a great deal of thought before it is changed. Names are so very much dependent on the way in which the first explorer happens to go. If he comes from the north he will give one name; if from the south another; if accompanied by Chinese interpreters he will give a Chinese name; if accompanied by other interpreters other names get used. I think that once a name has been current for a good many years I should be very sorry to make a change.

General C. G. BRUCE: All I wish to say about the name is that in all my old maps I have always seen the ranges marked Muztagh or Karakoram, and further that I have always heard "Muztagh" used by the Baltis as a sort of omnibus word meaning snowy ranges. The language of the Baltis is a mixed language, and they might easily have adopted a Turki word. I have found that when talking to men in that part of the world, when they said "Karakoram" they meant the pass leading from Ladakh into Central Asia. Generally, no doubt, the Baltis do use "Muztagh" as an omnibus word meaning the snowy ranges, just as farther east they use the word "Barafwān," which merely means the snowy range, and as the Nepalese use Himal or Himal Shreni for the range and Himal Chuli for the high points generally.

Whenever I have heard "Muztagh" used among the Baltis it has always meant the snowy range. Personally I think it is rather absurd to use the word "Karakoram" for a snowy range as, after all, it only means black earth. I am quite certain that Tibetans east of Leh know nothing of the word "Karakoram," which is pure Turki, although it is possible that they may have heard of it as applying to the pass leading to Central Asia.

Colonel PHILIP NEAME: My experience is only as a traveller in those parts, but I have been in touch with some of the top villages near the glaciers and the permanent snows on the south side of the range under discussion, and I have certainly heard the name Karakoram applied to the range and to the region by people I have met on the south side. Now I would say that the name seems to be quite well established, and the type of people who know it are certain Europeans, certain educated natives, Kashmiri officials, and local travellers such as transport men, shikaris, and village headmen. So it seems a pity to change this name and bring in one which, apparently, does derive from the north of the range. The name Muztagh is derived from the north of the range, whereas the Karakoram name does appear to be known on the south side, which I maintain is the side we should consider. We are considering this area from the point of view of the Indian Empire. Apparently the authority for the name Muztagh comes very largely from the traders on the trade routes. Those are mostly Yarkandis, and I can quite see that they, passing over a high snowy range, refer to it by the generic term, "Muztagh," just as we should say when going up any part of the Himalayas, "There are the snows."

I can give an analogy to that, for the same sort of thing occurs in several other parts of those mountains. For instance, Nanga Parbat has two names. It is known as Nanga Parbat from the south, the Kashmir side, and it is named Nanga Parbat on our maps, whereas it is known as Dumani on the north side, which I believe is the Gilgit name for it. However, one would not put that forward as a reason for renaming Nanga Parbat on all our maps and calling it Dumani.

General BRUCE: It is on most of the maps.

Colonel NEAME: Anyway, Nanga Parbat is the name from the Indian Empire point of view. Then there is one other analogy. Travelling in the Himalaya you find the local natives, where they talk Urdu, referring to the high snows as the "Bara pahar" or "Bara barf," which mean great hills or great snows. In the Garhwal Himalaya I have heard them refer to the high range in that way. You would not change the name Himalaya because local natives have not what one may call a proper name for the range. As a rule, in one's experience out there local villagers have no name at all for a range; they call the most conspicuous hill at the head of their nullah generally by the name of the village they live in. Round Haramosh I have heard four different names for it, but none of them Haramosh. Therefore I would advocate that when a name such as Karakoram has been known for many years, at any rate to the educated inhabitants of the region, we should maintain it and keep it for both the region and for the high range.

The PRESIDENT: Mr. Hinks, would you like to say a few words with regard to the map?

Mr. HINKS: Without having any knowledge of this country except that gained vicariously as editor of the *Geographical Journal* which, as you know, has published from time to time certain discussions upon this question, I may say that the point that has always struck me is the real difficulty of looking upon mountains there as ranges. Sir Sidney Burrard has defined a range as a "curvilinear alignment of peaks," but I feel from what experience I have of the matter that there is a good deal to be said for Dr. Longstaff's use of the word "complex," or something equivalent to it. I was glad to hear him use that word rather than "range," for there are many things called ranges on one side which do not appear as ranges from the other side—the Drakensberg, for instance.

A point which in the earlier discussions has not been brought out, but one that has appealed to me, is the desirability of, as far as possible, naming districts, big groups of mountains, rather than ranges. Dr. Longstaff pointed out that the practice in the Alps had now settled down into dividing up the mountains into groups separated by conspicuous valleys and celebrated passes. It seems to me from the general geographical point of view very desirable to have such a name for such a region as that between the Nubra and the Upper Shyok and south of the Saser pass. It would not debar it from being part of the Muztagh-Karakoram or any other general name adopted for the range. One wants a name for that group of peaks which is now known, roughly, as the Nubra peaks, although I do not know why the Shyok has been left out. It is most difficult to find proper names for those. I hope we shall not have to adopt the bad device of the botanists or gardeners who make compound names out of two adjacent names. They would like to call it the Shybra or the Nubrok, which is convenient, but ugly. That is all I have to say upon the subject of the large and general question.

The question of names of individual peaks will come very much later, but I would like to express the hope that as a result of this discussion we may continue it, first of all informally after this meeting and then perhaps at a later date in the summer have a round-table conference in order that we can put forward to the Surveyor-General of India certain suggestions, if there comes to be any agreement, in response to that very courteous and generous suggestion made by his

predecessor, the ex-Surveyor-General, that the Survey of India would be very glad to listen to the views of the Royal Geographical Society upon this subject.

Mr. J. H. REYNOLDS: With regard to the word "Muztagh," Robert Barkley Shaw, who I suppose is still the great authority on Turki, says in his Vocabulary that it means "a glacier; also a snowy mountain. See remarks regarding the application of such words as proper names under *Aqtagh*." There he says: "*literally*, white mountain, *i.e.* snowy range (as distinguished from mountain ridges on which the snow is not perpetual). Locally this word [and he is referring also to Muztagh] is often used as a proper name applied to the particular snow mountains of the neighbourhood; but its use in general geography should be supplemented, as in native use, by prefixing the name of the locality, as in English we say: the Brighton Downs, the Wiltshire Downs, etc. The neglect of this causes much confusion and false geography." So apparently the term "Muztagh-Karakoram" ought to mean that part of the Karakoram which has ice and snow. I have never been within thousands of miles of this district, but I presume that other parts of the Karakoram have ice and snow, which are not confined to the part to be called the Muztagh-Karakoram.

Mr. TOMBAZI: I have not visited that part of the Himalaya—my only travels have been round Kangchenjunga; but for the reasons put forward by Major Mason I am rather inclined to agree with the suggestion he made of renaming the mountains of the Karakoram district.

Major MASON: Dr. Longstaff has replied to a great many questions, and I think we might discuss the subject again at a round-table conference, however much we may dislike the sound of that word at present. We might preferably have a square-table conference and talk the question over and try to come to some agreement. I suggested the name Karakoram-Himalaya, joining the two words together, mainly because it has been coming into use for a good number of years. For the past twenty years the maps of this district have been headed Karakoram-Himalaya.

Sir SIDNEY BURRARD: Whose maps?

Major MASON: Several isolated maps published by the Royal Geographical Society or the Italian Geographical Society. For instance, Sir Martin Conway's map of the Baltoro was labelled so. However, I am not prepared to press this compound name, and Sir Sidney Burrard has given good reasons against its use.

Colonel Neame's statement that the word "Muztagh" is only known on the north is not correct. I asked the Mir of Hunza where the Muztagh mountains are, and he said, "To the East." His language is Burishuski and not Turki. He knows that the snowy mountains on his east are Muztagh. Longstaff has also shown us that in Vigne's day he got the name Muztagh from Baltis on the south. Godwin-Austen heard it on the south. I have heard traders both Turki and Tibetan (that is to say men from Leh) using the term "Muztagh" for the ice-mountains north of them on the Saser pass. Muztagh is a descriptive name for the ice-mountains (used originally by the Turkis), which every one in their neighbourhood has now come to know; the name Karakoram is not used for these ice-mountains by them.

In my paper I purposely mentioned our predecessors as little as possible, because I did not want to start a discussion on their respective merits or let it be thought that I was belittling their work in any way. I never have belittled the work of our predecessors and never will. But as Sir Sidney Burrard asked me to let him have some proof that Karakoram is used for the pass and not for the mountains, on the spur of the moment I have sent to the library for one book—that by Colonel Wood of his explorations with the De Filippi expedition. Wood

says, writing on the name Karakoram*: "The name is applied by the traders to the pass alone and not to the mountains. Dr. Thompson, who, in 1848, was the first European to reach the pass, found the same in his day (*J.R.G.S.*, vol. xix), and Hayward, in 1869, repeats the same information (*J.R.G.S.*, vol. xl). The latter appears to have been the first to suggest applying the name of the pass to the range, so it may be as well to remember that this extension of the name is purely due to Europeans."

I have no other evidence I can quote at the moment.

Sir SIDNEY BURRARD: I asked you to produce evidence as to which British explorer had taken the name from the pass to the mountains. That evidence is only that Colonel Wood says some explorer has done it.

Major MASON: He says "The name is applied by the traders to the pass alone and not to the mountains. Dr. Thompson . . . found the same thing." So did Hayward. Colonel Wood supports his statement with references.

Sir SIDNEY BURRARD: But British explorers before Hayward or Wood had found the name Karakoram applied to the mountains. I was quoting men of 1820 and 1840 who found the name Karakoram applied to the mountains by the natives.

Major MASON: I am sorry, Sir, I cannot say more than this. I do not know who applied the name to the mountains. I suppose it was applied to the mountains by the people at Dehra Dun.

Sir SIDNEY BURRARD: You only have to look at Moorcroft's Diary of 1820, before the office at Dehra Dun was built.

Major MASON: Moorcroft applied it generally to the undetermined mountainous watershed between the Tarim and the Indus basins, on which is situated the Karakoram pass—simply to the mountains at the watershed. The name of the pass was the only name he knew on the whole of those mountains. Neither Moorcroft nor Cunningham saw the Muztagh.

Sir SIDNEY BURRARD: Moorcroft got the name from the Tibetans and applied it to the mountains.

Major MASON: Is there any proof of that?

Sir SIDNEY BURRARD: There is his Diary and Cunningham's book of 1847.

Major MASON: I do not think Cunningham ever actually went anywhere near those mountains.

Sir SIDNEY BURRARD: He explored the whole Indus valley, and surely the people of that valley, who are always seeing a mountain in front of them, have some voice in the matter.

Major MASON: I do not think the people of the Indus valley can see the mountains we are discussing.

General BRUCE: Have not they got it from those Aghil travellers who ply continually between Leh and the Karakoram? They go backwards and forwards over the Karakoram and Saser passes. Therefore they gave the name to the pass.

Major MASON: Those travellers use the name for the pass only and not for the mountains.

Sir SIDNEY BURRARD: What I say is that no British explorer took it from the pass and gave it to the mountains.

General BRUCE: It is said he got it from the traders who were his transport.

Sir SIDNEY BURRARD: He got it from the Tibetans.

General BRUCE: They were half-castes. It would not be a Tibetan name because it is pure Turki.

Sir SIDNEY BURRARD: Moorcroft is before Vigne and Cunningham is in 1847,

*'Explorations in the Eastern Kara-koram and the Upper Yarkand Valley,' Col. H. Wood, p. 7.

and Dr. Longstaff quoted Godwin-Austen. On Godwin-Austen's grave there are the words: "He explored the Karakoram range."

Dr. LONGSTAFF: Vigne was the first traveller who went in. Moorcroft never set foot on the ice. Vigne practically went up.

Sir SIDNEY BURRARD: Surely inhabitants 50 miles from the mountains have as much right to have a voice in the name as those who live on the ice.

Dr. LONGSTAFF: No one has ever lived in those mountains.

Sir SIDNEY BURRARD: The people living in the Indus valley have always given the name Karakoram.

General BRUCE: Not in the lower part of the Indus valley. The Baltis still use the name Muztagh because they think it is the name you will understand.

Sir SIDNEY BURRARD: What happens in many places is that there are two different sets of people and they are each using a different name.

Dr. LONGSTAFF: No Tibetan ever goes over the Karakoram pass.

Sir SIDNEY BURRARD: It is not people who cross but who live in sight of the mountains.

Dr. LONGSTAFF: No Tibetans live in sight of those mountains.

Sir SIDNEY BURRARD: The people who named the Himalaya are those who live in the plains of India.

The PRESIDENT: I think I must now close the meeting. It seems that we have had a useful preliminary discussion, and we shall hope that it will lead eventually to the conference that has been suggested. It is quite certain that the whole of this area must be studied by the aid of Major Mason's map. I do not believe that any here can fully understand the arguments that Major Mason has brought forward without a study of that map, and I personally should be very glad if the Society were able to publish it, but map-publishing is expensive. If we could publish something like it, it would help all interested in the subject, because there is no map now in existence which contains the information that that map does. I am sure we are all grateful to Major Mason for introducing the subject; and for the production of the map. In your name and the name of the Society I thank him

Note on Sir Sidney Burrard's paper, "The Geographical Representation of the Mountains of Tibet," published in the Proceedings *of the Royal Society, Ser. A, vol.* 127, 2 *June* 1930.

This paper was received by the Royal Society on March 18, and was read, after publication, on June 12. It seems convenient to note here its principal points, for consideration with its author's contribution to the above discussion.

In the discussion Sir Sidney Burrard maintains that "the Karakoram mountains stand in Tibet. The Tibetan population live on the south side of the range." He is thus not speaking of the mountains to which Major Mason's proposals refer, but to mountains much farther east which he believes are continuous with what is generally meant by the Karakoram.

Similarly the title of the paper published by the Royal Society limits it to the mountains of Tibet, of which country "the Karakoram forms the central backbone which is the second highest range of mountains upon the earth . . . The main features of the Karakoram were determined in 1855–1865 by Colonel Montgomerie's surveys. . . . In 1870 . . . its eastern prolongation was unknown. In 1874 the survey sent the pundit Nain Singh to explore Central Tibet. . . . The view adopted by the Survey, 1878 to 1880, was that Nain Singh's range was probably the easterly continuation of the Karakoram. . . . In his book published in 1909 Sven Hedin also showed that the prolongation of the Karakoram range through Central Tibet was 2° further north than had been thought. . . . Since 1914 the surveys of De Filippi and Wood have given additional confirmation to the correct-

ness of the accepted alignment." The paper then criticizes Major Mason's proposed revision of the Karakoram ranges, but without indication that neither Montgomerie nor De Filippi and Wood in 1914 nor Mason was concerned at all with Tibet. The argument thus briefly traced above is therefore a little difficult to follow. The ill-defined watershed in the neighbourhood of the Karakoram Pass is at one time "a ridge carved out of the northern slopes of the Karakoram range," but a little later the "great divide" and "the high Karakoram crest-line."

It is more difficult to follow Sir Sidney Burrard in his statements: (1) that Colonel Wood's map "showed that there was no Aghil range." His map did not extend so far; (2) that the feeders of the Yarkand and Karakash rivers flow straight away from the main divide without encountering any serious obstacle: there is at least the gorge of the Karakash; (3) that the publications of De Filippi's and Wood's surveys have taught us that no trough exists behind the Karakoram. He has himself referred in the preceding paragraph to the deep trough of the Shaksgam which lies behind the highest peaks of what most people, but not he, would call "the real Karakoram Range"; (4) that the old alignment had been adopted in consultation with geologists—a suggestion made in the *Journal* for September, 1929, (vol. 74, p. 276) but repudiated by Sir Sidney (*G.J.*, 75, 1930, pp. 35–37).

The paper is written to advise "geologists and meteorologists and all who are interested in small-scale maps to consider the questions at issue before they accept the new geographical representations," but it gives no hint that at the invitation of the ex-Surveyor-General of India the whole subject is in active discussion by this Society.—ED. *G.J.*

At the request of the Editor, Dr. Emil Trinkler has kindly sent the following interesting contribution to the discussion :

The name "Aghil-Karakoram" suggested by Major Mason for the ranges stretching north of the main Karakoram Range is certainly worth considering. All the ranges in which also the Aghil Pass and the Karakoram Pass are situated belong together as well from an orographical as from a geological point of view. Therefore I do agree with Major Mason's proposal in calling all these ranges between the Western Kunlun and the main Karakoram Range the Aghil-Karakoram, or Northern Karakoram Range, if we call the Kailas Range the Southern Karakoram.

Perhaps the name of "Karakoram" alone would do for the high range of snow peaks. But if these mountains are to have a special name, "Muztagh-Karakoram" would really be the best name to give, if not simply the Karakoram Range.

The name "Kailas-Karakoram" should be altered. The high snowy mountains called Kailas-Karakoram have nothing to do geologically with the Kailas Mountain, which is so far away, and which, from a geological point of view, is only a pyramid carved out of a sedimentary filling of Pliocene Age, the strata being only slightly disturbed. Furthermore it is still unsettled whether topographically the "Kailas-Karakoram" finds its continuation to the east in the mountains round about the Kailas. Very probably we have to look for its eastern continuation in the ranges north of the Kailas. Therefore I would suggest altering the name of Kailas-Karakoram to "Southern Karakoram Range."

Thus we might have the

Aghil-Karakoram	=	Northern Karakoram Range.
Muztagh-Karakoram	=	Main Karakoram Range.
Kailas-Karakoram	=	Southern Karakoram Range.

AN UNDESCRIBED MAP OF LOPO HOMEM, 1519

A PORTUGUESE map drawn on vellum and dated 1519 by its author, "Lupus Homo," was sold at Sotheby's early in May, and by the courtesy of its purchaser we have received a full-size photostat copy for preservation in the Society's map collection. Its chief interest lies, perhaps, in the fact that it is the earliest known specimen of the work of an important Portuguese family of cartographers, which continued to produce MS. maps down to at least the seventies of the sixteenth century. It is also one of the very few specimens of the work of Lopo that have survived, though unless there were two individuals of that name he must have been at work not much short of forty years.

The author's description of the map, written on the back, is as follows: "Hec est universi orbis ad hanc usq[ue] diem cogniti tabula Quam ego Lupus homo Cosmographus in clarissima Ueisipone civitate Anno domini nostri Millesimo quingentessimo decimo nono Jussu Emanuelis incliti lusitanie Regis collatis pluribs alijs tam vetustorum q[uam] recentiorum tabulis magna industria et dilligenti labore depinxi." Within its outer rectangular border the map measures 36·5×53·2 cm., the circular border of the map proper having an outside diameter of 34·4 cm. The sea is shown by a blue shading, while the main features of the land surface are in a light green.

According to Sousa Viterbo ('Trabalhos Nauticos dos Portuguezes . . .' Lisbon, 1898, Part i, p. cxxxiii), Lopo Homem received from King Manuel, in 1517, the exclusive privilege of constructing and correcting "agulhas de marear" (nautical compasses). In dealing with his much later map of 1554 Abendanon takes this to imply that he had also the commission to make maps ('Voyages géologiques et géographiques à travers la Célébes,' vol. 3, 1918, p. 1430); and as the 1519 map is stated to have been made at the King's order, this may be correct. He is best known for the large map of the world made in 1554, preserved at Florence, which has been reproduced by Caraci in his 'Tabulae Geographicae Vetustiores in Italia adservatae,' Part 1, Florence, 1926. Only one other map from his hand seems to be yet known, and this is undated but said to be before 1543 (Harrisse, ' Discovery of North America,' 1892, p. 646, note 46. It is (or was) preserved in the Salviati Library at Pisa.

Its small scale and lack of detail place the 1519 map in quite a different class from the later productions of the family, which were generally of large size or consisted of a number of separate sheets. But although presenting a mere outline of world geography (only the continents and oceans, and a few of the principal countries being named), it seems, as its author claims, to have been constructed with care, and it gives a good general idea of the relations of land and sea, and the forms of the continents, in the parts then known. As there is no clue to the method of construction there is no criterion by which its correctness or otherwise can be judged. The choice of a circular framework—after the pattern of many mediaeval maps—no doubt involves distortion of the outer parts, but not more than may be caused by the use of recognized systems of projection, and for these parts the knowledge at the time was anyhow very imperfect. If we may suppose the vertical diameter to represent the distance from pole to pole, the relation between latitude and longitude will certainly be incorrect, for the horizontal diameter embraces about 220° of longitude, or a

good deal more than half the circumference of the globe. But it is possible that the circle is merely drawn to form a symmetrical border, and that the proportions are more correctly maintained for the central zone, embracing the known parts of the world.

The most singular feature is the practically complete ring of land encircling the Atlantic and Indian Oceans, traceable in part to the influence of the Ptolemaic tradition, by which the south-east of Asia was united to Africa, making the Indian Ocean a closed basin. As the idea of such a connection was no longer tenable, the southern land has been shifted farther south, and a connection made between South-East Asia and the south of South America, the southern land being regarded as an extension of the "Mundus Novus." In carrying a continuous coast-line from Southern China round the east of the Malay Archipelago, Homem agrees with another Portuguese map of the period —one of the Indian Ocean of *c.* 1516, by the Reinels (see Denucé: 'Origines de la Cartographie Portuguaise,' 1908, with outline-sketch). Similarly the closing in of the North Atlantic by land joining America to Northern Europe has its counterpart in maps made in Italy, *e.g.* that of Fra Barbolan (1514) reproduced in the *Journal* for February 1908.

As the Pacific side of the globe is not represented we have no clue to Lopo's ideas as to the extent of that ocean, the existence of which was of course known by 1519. The bounding circle cuts off a portion of the coast of Central America and another of North America, so that the possibility of a sea-passage westward at either of these points is not excluded. It might be thought also that the inlet by which the coast-line is broken to the south of South America is an indication of Magellan's Strait, of which, it has been thought, some hint may have reached Europe even before Magellan's voyage. And the opening certainly appears to be more nearly in the true position of the Strait than that shown in the Schöner maps which have been held to indicate an early knowledge of it. But as similar channels are shown at random as river-mouths in other parts of the southern land this may be merely another of the same kind. And it is conceivable that a political motive underlay the general representation, for a continuous ring of land would leave the Portuguese masters of the only sea-route to the East Indies.

The French coat of arms drawn below the title on the back of the map suggests at first sight that it may have been made by command of the King of Portugal for presentation to a French Royal Personage. But as they exactly correspond to the arms borne by Catherine de Medici as Queen (or widow?) of Henri II, whom she married in 1533, they would appear to be a later addition, made after the map came into her possession in some other way.

E. H.

TABLES FOR THE PRISMATIC ASTROLABE

STAR LISTS: Being Lists of Stars for Each Degree of Latitude from 60° North to 60° South with their Approximate Local Sidereal Times and Azimuths of Crossing the Altitude of 60°, with Magnitudes, Names, and Approximate Right Ascensions, including all Stars for which Ten-day Places are given for the Year 1930 in the American *Ephemeris*, British *Nautical Almanac*, or the French *Connaissance des Temps*. Also Suggestions for the Adjustments and Use of Reeves's Prism Attachment for Theodolites. Compiled by WELD ARNOLD. *New York: American Geographical Society, School of Surveying. Publication No.* 4. (*London: C. F. Casella & Co., Fitzroy Square.*) 1930. 11 × 11 *inches;* 440 *pages. Three guineas.*

THE method of obtaining latitude and local time simultaneously from equal altitudes of stars at different bearings has certainly much to commend it both for simplicity of observation and accuracy of results; and after the invention of Messrs. Claude and Driencourt's *Astrolabe à Prisme* it began to come into more general use. A few years ago the reviewer brought out his Prismatic Astrolabe Attachment for a theodolite, which obviates the necessity of carrying a special instrument for the observations—a considerable advantage where weight is a serious matter—so that altogether the equal altitude method is becoming more generally employed by surveyors abroad.

Although the observation itself is simple, an elaborate programme of suitable stars has to be prepared beforehand. Many of the stars observed are small, and the telescope is pointed horizontally, not at the star, so that in order to find the star it is necessary to know, before starting to observe, the approximate local time when it reaches the altitude of 60°, which is the altitude of observation, and the azimuth at that time.

The publication of Ball and Knox Shaw's 'Handbook of the Prismatic Astrolabe' greatly facilitated matters, for apart from giving an excellent account of the Prismatic Astrolabe—the first in English—it contains tables of the required data for a certain number of stars from 55° N. to 55° S. latitude. Still, valuable as this list is, it was frequently found that it did not contain a sufficient number of stars for satisfactory observations. To compute these data, even by the aid of diagrams devised to assist, is a somewhat lengthy and tedious operation, with many chances of error until a man gets familiar with the operations; so that what the surveyor wanted was a much more extended and complete list on the lines of that in Ball and Knox Shaw's book. Through the public-spirited generosity and keen interest in scientific geography of Dr. A. Hamilton Rice, this has now been published by the School of Surveying of the American Geographical Society, and a copy of the tables has been presented to our Instruction Room.

It was on Dr. Hamilton Rice's latest expedition in South America that the Prismatic Astrolabe Attachment to a theodolite was first used, and in preparation for this Mr. Weld Arnold, the principal surveyor of the expedition, and Mr. O. M. Miller, both of the American Geographical Society, prepared programmes of stars for the latitudes in which the expedition would be working. These were found so useful that after the expedition was over Dr. Hamilton Rice, for the sake of other surveyors, undertook to bear the entire expense of bringing out these tables for every degree of latitude between 60° N. and 60° S. latitude. The work has been carried out under the superintendence of Mr. Weld Arnold, and has taken over four years to complete; and in order to bring the tables out in reasonable time several assistants have recently been helping with the computations, preparing the lists, and checking proofs.

M

The tables were first typewritten, and photostat copies were issued in separate covers for each degree of latitude as they were ready. They have now been printed and published in one volume, consisting of 440 pages, of which the star lists themselves occupy 389 pages, while the remainder are taken up with a description of the lists, examples of computation forms and graphic plottings, and a chapter entitled "Suggestions for the Adjustments and use of Reeves's Prism Attachment for Theodolites," which is very complete and well illustrated by plates and diagrams. There is also an interesting account of the manner in which the lists have been prepared.

The star lists themselves are arranged in four columns on a page and contain altogether about 94,000 stars. They have been compiled from the American *Ephemeris*, British *Nautical Almanac*, and French *Connaissance des Temps*, which are indicated by the letters A, B, and C. The first column in the lists gives the azimuth of the star to the nearest quarter of a degree when it reaches the altitude of 60°, the second the corresponding local sidereal time, the third the star magnitude, the fourth the name of the star, the fifth its approximate Right Ascension, and the sixth the nautical almanac from which it has been taken. For all practical purposes of finding the stars these tables may be considered permanent.

Although these star lists have been especially prepared for surveyors observing with the Astrolabe Attachment, they are of course equally suitable for use with the Prismatic Astrolabe itself. The work reflects great credit on Mr. Weld Arnold and all those who have had to do with its preparation. Very properly it is dedicated to Dr. Hamilton Rice "whose generosity and vision for scientific exploration" have made the volume possible. The cost must have been very great. There can be no doubt that many future explorers and surveyors will fully appreciate the valuable assistance these tables afford; and that they were computed primarily to facilitate observations with the Prismatic Astrolabe Attachment, which was for the first time used so successfully on the last expedition of Dr. Hamilton Rice in South America, is most gratifying to the reviewer, and he desires to express his personal thanks. E. A. R.

REVIEWS

HISTORY OF BRADWELL-ON-SEA, ESSEX. By HERBERT BROWN, Rector of St. Lawrence. *Chelmsford: J. N. Clarke & Co.* 1929. 9×5 *inches;* 196 *pages; and illustrations.* 6*s*

The remote but interesting village of Bradwell-on-Sea is some 30 miles from Colchester *via* Maldon, and attracts by reason of its old chapel of St. Peter's-on-the-Wall and some remains of a Roman fort. Of this parish the author discourses pleasantly and learnedly—the church of St. Peter, the rectory, the manors, and so on. The village cage still exists, the present one dating from 1817; when the constable had a good haul it had accommodation for sixteen malefactors, six in the cage itself, and ten in the pillories, one of which was set on each side post. The name Bradwell means the broad wall made for a defence against the sea. Known to fiction under disguised names in the pages of S. L. Bensusan, Rider Haggard, and others, the village, now so quiet, is historically rich in its associations, which include a Roman garrison, the chapel for preaching of the Saxon Cedda, a connection from 1068 to 1391 with St. Valery-sur-Somme, and the brisk days of smuggling. It is now threatened with development, and this history is timely. The Roman lore on p. 1 makes somewhat bizarre reading, and the complete acceptance of Bradwell as the Roman fort of Othona is not justified. That there was a Roman fort at Bradwell has been known since 1610; moreover, it was excavated in 1864. This may yet prove to be Othona, but it has not at present been conclusively identified, and Walton, near Felixstowe, is a rival in the claim. Again, philology finds the derivation of Ythan from Othona very improbable, and any connection between Ythan and Effecestre still more so. Waymark's map (p. 140) should have been reproduced larger; as given it is so indistinct as to be almost useless. (In the illustration list, p. vii, "Freize" is a misprint.)

S. E. W.

HOLIDAYS IN SWEDEN. By J. B. PHILIP. *London: Skeffington & Son* [N.D.]. 8×5 *inches;* viii+316 *pages; illustrations.* 6*s*

This book is issued by the publishers without a date. Chapter xiii appeared originally in the *Scotsman* as long ago as 1914, and several other chapters need bringing up to date. In writing of Stockholm the author omits all mention of the new Stadhus, the most conspicuous building in the modern city. Saltjöbaden he finds stagnant, but the popular seaside resort of the Stockholmer, with its yachts, motor boats, and general gaiety, is to-day anything but dull. Särö, some 20 miles south of Gothenburg (which is reached by train and not by steamer), is one of the most fashionable seaside places in Sweden, and any one who has visited the island during "tennis week" will be surprised to be told that outdoor amusements are lacking in Swedish holiday resorts. Such statements in a book intended to attract visitors to Sweden are likely to give a false impression of present-day conditions.

Where customs remain unchanged, as in Dalecarlia and Värmland, the author has much information to impart which is obviously the result of close personal observation. If Västerås has been changed since his visit into a busy industrial post-war town by the Asea works, the descriptions of farmhouses, country *pensions*, and rural social conditions are very accurate. For an Englishman who has little Swedish at his command (we suspect the author of modesty) he has established a very close personal contact with the peasant population.

The book is illustrated with photographs, most of them well chosen and fairly well reproduced.

Ll. E. W.

DAYS ON DARTMOOR. By C. W. PILKINGTON-ROGERS. *London: Methuen & Co.* 1930. 8×5 *inches;* xi+235 *pages; and illustrations.* 7*s* 6*d*

The author, not a native of Dartmoor—he knows too much of the moor—but a frequent tramper thereon, has written a capital book, "intermediate between the highly specialized books of antiquarian interest on the one hand and the very detailed walker's guide of Crossing's on the other." It is not so much a guide as an aid to those who wish to catch the spirit of the moor and do their own discovery. He divides the region into seven districts—south, east, north-east, north, north-west, south-west, and central. The map he recommends is the O.S. Tourist Map of Dartmoor, 1 inch to the mile, covering the whole area in one sheet. He delights in a region you may have to yourself, in its "spaciousness, sublimity, majesty and austerity": he loves it because it is lonely, silent, bleak and desolate. He writes well, and even eloquently—note the description of sunrise at sea from Yes Tor (p. 141). The pages abound with a racy humour, derived largely from close observation and personal experiences. The six introductory chapters give the necessary general information about the moor, for example, about the old tracks across it. Any one who knows the land of tors will find this a delightful book: he who does not will want to set out with pack and companion, unless he be of the author's mind, the real Dartmoor enthusiast who prefers to tramp alone. Incidentally a popular misapprehension is corrected, about the "Judge's Chair" at Dunnabridge Pound. The derivation of the word "forest" from *feresta*, a place of wild beasts, is certainly not orthodox, and probably not correct; the received etymology is Lat. *foris*, outside, that is, the district outside the park, reserved for royal hunting.

S. E. W.

THE ECONOMIC DEVELOPMENT OF POST-WAR FRANCE: A Survey of Production. By WILLIAM F. OGBURN and WILLIAM JAFFÉ. (Vol. III of Social and Economic Studies of Post-War France. Edited by CARLTON J. H. HAYES.) *New York: Columbia University Press* (*London: Humphrey Milford*) 1929. 9×6 *inches;* xii+614 *pages; diagrams and maps.* 30*s*

This book is the result of an admirable piece of team work carried out under the auspices of the Columbia University Council for Research into the Social Sciences, and under the leadership of Professor Ogburn of the University of Chicago. It traces the course of an inquiry into the Post-war Economic Development of France and analyses the results obtained with care and precision. The main conclusion at which the authors arrive may be found on page v of the Preface: "There is striking evidence that the continuity of France's economic development, with its roots deep in the past, has been less affected by the war and inflation than is ordinarily supposed," and on p. 213, "France was indeed more advanced industrially in the later post-war years than before the war. The difference however is by no means large enough to justify any assertion of a second 'industrial revolution.' . . . It is difficult to tell, without sufficient perspective, which will come only with time, whether this development was spurious and short-lived or real and enduring. . . . As to the future, the trend appears definitely upward. With new coal and iron resources, with vast reserves of water power as yet untapped, there is reason to look forward to a continuation of the process of industrialization."

Part I (215 pages) begins with a general sketch of the pre-war economic conditions in France, in which the authors emphasize the fact that the economic position of France before the war was in no sense stationary, that her general development had been increasingly rapid in the years immediately preceding the war, though not so rapid as that of Germany. "The immense volume of imports

of raw materials and of export of manufactured goods, the imposing aggregate of investments abroad, the size of the French national income all give the impression of great progress in French industry before the war."

The authors then trace developments during the re-construction period, pointing out what France lost by the war and what she gained by the Treaty of Versailles. They show that, even within her pre-war boundaries, the stimulus that the occupation and devastation by the enemy of the North-East gave to productive forces in the area behind the lines was of lasting value. So that France began her post-war career "with two contradicting tendencies—one towards further impoverishment and the other towards greater material riches." There follows an estimate of the value of her new bases of power, provided by the acquisition of Alsace and Lorraine Annexée, the use of the Saar coalfield, and her new colonial resources. Then comes a chapter on Currency and Capital and the effects of inflation on trade. Chapter VIII deals historically with the process of industrialization in France.

Part II (367 pages) will be peculiarly useful to students of Economic Geography. It consists of a systematic examination of the major industries including agriculture, throughout which attention is given to modern tendencies.

According to the authors the war was directly responsible for the increase in size of plant and for increased output in the light engineering industries—the armament factories turning over to the production, on a large scale, of motor cars and to tool making; the re-equipment of the factories of the devastated areas and the additional iron and pig-iron resources of Alsace-Lorraine providing an indirect stimulus. They deplore the geographic dispersion of the engineering industry in France as being inimical to large-scale production. "There was hardly a perceptible tendency in the direction of bringing the machine-making and electrical equipment factories closer to the principal source of raw material where they might become concentrated and produce on a larger scale. Tradition had laid its hand too heavily on French industry to permit of a rapid change." They admit however that the wide diversity of products almost necessitates the proximity to very different kinds of market.

In the instance of the silk industry, on the other hand, they admit the danger to which the manufacturers might be exposed if the French abandoned their highly skilled and highly specialized methods for mass production; for they would thus come into direct competition with America, whereas their fame for highly artistic and constantly varying products gives them actually a unique place in the world's markets. Perhaps more emphasis might be given in the discussion of French industry, to what appears to be an important compensating factor: to wit, the flexibility in response to changing markets that it exhibits. In the silk industry particularly, the decentralization of the actual fabrication and its dissemination over a wide pastoral and agricultural area, coupled with the advantage of a highly expert central advisory organization in close touch with the headquarters of fashion, results in a highly sensitive machine, capable of rapid adjustment without serious disorganization. It may be significant that the silk industry and that of light engineering—the least concentrated and the most flexible of French industries—are precisely those which show a steady prosperity.

The book furnishes, incidentally, a most useful commentary on French statistics of trade and industry generally. The geographer will find it an admirable general analysis of post-War economic conditions up to 1927. It may be noted that the authors had not the advantage of consulting Mr. J. R. Cahill's Report on Economic Conditions in France in 1928, published by the Department of Overseas Trade. The reader must not expect to find any regional treatment of

economic conditions and industrial development. Such detailed work would be outside the scope of the book and moreover the statistics would be exceedingly difficult to come by. H. O.

SPAIN: Yesterday and To-morrow. By HENRY BAERLEIN. *London: Herbert Jenkins* 1930. 9×6 *inches;* x+320 *pages; and illustrations.* 10*s* 6*d*

THE ROADS OF SPAIN: a 5000 miles' Journey in the new Touring Paradise. By CHARLES L. FREESTON. With a Foreword by the Spanish Ambassador. *London: Humphrey Toulmin* (*The Cayme Press*) 1930. 8×5 *inches;* 270 *pages; illustrations and maps.* 10*s* 6*d*

SPAIN: a Companion to Spanish Travel. By E. ALLISON PEERS. (The Kitbag Travel Books.) *London: George G. Harrap & Co.* 1930. 7×5 *inches;* 296 *pages; illustrations and map.* 7*s* 6*d*

Mr. Baerlein's is an unassuming book, dealing lightly "with transitory matters" incidental to an unhurried tour in Spain, during which the author had time to dip everywhere into the local archives and histories. The book is pleasant, gossipy, a little naive, but above all things restful.

Very different is the atmosphere of 'The Roads of Spain,' a practical road-book for the motorist, with interspersed descriptions of the sights and scenery, of the kind supplied by British railway companies in the guides on sale at their booking-offices. Mr. Freeston's well-sustained eloquence is for the "banked corners, red and white trellis fences round the curves, and roadmenders' houses with their useful distance indications" and the other excellences of the new highways of Spain, "the motorist's Paradise." For the Prado Museum, on the other hand, four bald lines are ample, since "the motorist on tour has none too much time to devote to museums and picture-galleries," and of course he has not, if he has 6640 miles of road to travel "out and home from London."

It is fair to remember, however, that the author's professed subject is the roads, and these are very thoroughly described here by an expert motorist; it is to be hoped that the description may assist in attracting the tourist traffic so necessary to compensate the Spanish taxpayer for his outlay. By these roads the modern traveller is returning, one notes, to places like Aracena, Luarca, and Cuellar, which have disappeared from the Englishman's guide-books since the days of Richard Ford (Mr. Freeston exaggerates when he says that these places are not to be found in any guide-book). But the mechanical difficulties of the journey are all smoothed out to-day; in one stretch only, the warning "Attention should be paid to the tank accordingly" recalls Ford's "Attend to the Provend."

In the third of the volumes under review Professor Allison Peers, writing for those who find nothing but bewilderment in the detail of the ordinary guide-book, smoothes out the traveller's other difficulties. Here we are told just where to go in Spain and at what season, what to see when there and what to ignore, what emotions the sight should evoke and, above all, to what quiet nooks to retire with a book and what the book should be for each nook. The author even sets his reader down carefully in the nook and reads a page of the book to him or gives him an abstract of its story. It is all most restful. The advice is perfectly sound, too, even if not always quite so new perhaps as the author claims, except for the hints on where to spend August and for the valuable pointers to the best books of the last decade. But the traveller should carry one of the older guide-books as well in case he feels the need of a tonic. The photographic illustration, format, and printing of the book are exceptionally good: only two trifling misprints catch the eye. We must protest vigorously, however, against the author's treatment of *vega* and *huerta* in the glossary as if they were equivalent terms. R. A

ABOVE AND BEYOND PALESTINE. By C. E. HUGHES. *London: Ernest Brown* 1930. 9×6 *inches;* x+268 *pages; illustrations and sketch-maps.* 10*s* 6*d*

This is an account of the work of the East Indies and Egypt Seaplane Squadron, 1916–1918, in harassing the Turks, and frightening the Arabs. The writer makes the most of his very limited material, but the book contains little to interest either students of the war or geographers. There is some good description of Cairo, and for the rest the illustrations from sketches made by the author form the best part of the book. They hardly justify its publication. "Bagdad" is thus regrettably spelt. The name of the French cruiser mentioned on p. 115 should be Jauréguiberry—after the famous French sailor who was soldier (in 1871) and politician too. A. S. E.-S.

MEMOIRS OF TRAVEL, SPORT AND NATURAL HISTORY. By the late HENRY JOHN ELWES. Edited by EDWARD G. HAWKE. With an Introduction by the Hon. Sir HERBERT MAXWELL, Bt., and a Chapter on Gardening by E. A. BOWLES. *London: Ernest Benn* 1930. 10×6 *inches;* 317 *pages; and illustrations.* 21*s*

Henry John Elwes was a man of many parts and stands high in the ranks of traveller naturalists. He was not a student in the restricted sense, but spread his net widely into many countries, observing and collecting in all parts of the world, and particularly in those which still hold a glamour for men in search of discovery or adventure.

Tibet, Assam, Nepal, Malay, Formosa, Central Asia, Java, Chile—what a field of wonder, profusion and delight for this student of nature to have at his disposal! Elwes was favoured in what fortune gave him, and he made the most of his splendid opportunities. His travels were never aimless or barren of result. He saw much where others would see little. He recorded carefully and collected abundantly. His material he examined with detailed attention, and his many technical descriptions of it have added largely to our stores of knowledge. The reader of these memoirs will learn of a life packed full of adventure, enthusiasm, and discovery. He will follow Elwes in his several expeditions through romantic countries still imperfectly explored. To the ornithologist and entomologist they are likely to be of particular interest. For birds and butterflies were the fundamental passion of Elwes. It was the impulse to learn more of their distribution and habits that sent him to these diverse and remote regions. But he was a man of no narrow interest. He possessed that broad and receptive mind which characterizes the best of travellers and which adds so much to the narrative of their adventures. The peoples and their customs, the plant and animal life, the pursuit of game, and a hundred other things, are all crowded into these lifelong memoirs. In them also is many a sidelight on the leading naturalists of the last generation, such as Blanford, Godman, Salvin, Hume, men whom we know to-day so well by their work and so little through their personalities.

The latter part of Elwes' life was occupied largely with horticulture. In this again he excelled his fellows, and his standard work on the trees of Britain will long remain his chief memorial. Indeed, his life was a true romance, a long and ceaseless searching after truth. He lived it to the full. And to those who would care to follow in his footsteps, who would link travel with a striving after knowledge, these memoirs will be not only a source of interest, but also an inspiration and a guide. R. W. G. H.

CHINA TO CHELSEA: a modern Pilgrimage along Ancient Highways. By Captain D. McCALLUM. *London: Ernest Benn* 1930. 9×6 *inches;* 284 *pages; illustrations and maps.* 21*s*

This is an account of a journey across Asia by motor car made by the author and his wife when returning home on leave from China. Their route lay through Further India, India proper, Persia, Mesopotamia, Syria, Turkey, and Europe. Untoward circumstance compelled their setting out in June, which entailed travelling in the wet season in Further India and in Syria, and in the bitter cold of winter in Persia, whereby the unavoidable difficulties of the undertaking were much aggravated. The first section, through French Indo-China, with good roads and comfortable resting-places, went very well, but when the Siamese frontier was reached the difficulties of travelling during the rains became apparent and the party had to go on to Bangkok by rail. It is indeed unlikely that they could have got through Siam and Burma to India by car at any season.

Seven chapters of the book are devoted to Further India, with descriptions from the point of view of the passing traveller adequately supplied with letters of introduction and determined to miss nothing. French Indo-China is most fully dealt with, but of Siam there is not much, the author quite wrongly considering the Siamese a sort of poor imitation of Cambodians; and of Malaya and Burma there is still less. Of the roads of French Indo-China and Malaya however there is plenty, and something of those of Siam and Burma which ought to be there but are not. A chapter describes a pleasant crossing of India by the Grand Trunk Road Calcutta to Lahore, whence the party made a detour to Kashmir, Peshawar, and down the Indus, before going on to Quetta.

Beyond Quetta many difficulties were encountered. The roughest of tracks lies across the desert of Baluchistan, where "most motorists entrain their cars" on the railway which runs parallel, and from Duzdab onwards the roads are scarcely better, with added dangers from frost, ice, and snow. From Tehran to Beirut Captain and Mrs. McCallum were on the scene of former motoring exploits. Everlasting mud, contrary officials, and the only serious mechanical breakdown experienced, marked the section through Syria as one of the worst. Dirt and difficulties accompanied the wayfarers across Turkey, but meandering easily through Europe such troubles gradually fell behind, and a comfortable run from Antibes to Paris and on brought the party at last safe home to Chelsea, some 1500 miles of road travel having been accomplished in just over eleven months.

This journey may be distinguished from most similar undertakings by the comparative absence of transport trouble, due to the superiority of the two very serviceable cars used, to an abundant supply of spare parts, and to the presence of two highly qualified mechanics with the expedition; and by the thoroughness of the staff work which secured the hospitality of Princes, Ministers, Governors and Consuls all along the route, smoothed away frontier difficulties and provided porters, ferry-boats, mules, and so forth when required, and escorts from the guards of many Eastern States. Set forth as it is here, with intelligence and humour, it makes an absorbing tale. The author touches on Chinese politics and outlines the history of French Indo-China, but is best when he keeps to the narrative, with vignettes of things seen by the way. His Further-Indian nomenclature is uncertain. French authorities notwithstanding, Indo-China properly implies all Further India and not French territory only. "Malay" and "Malaya" are not synonyms, and there is no reason why Malays should be called "Malayans" or, even worse, "Malaysians." The terms "Laos" for the country of the Lao and "Annamites" for Annamese, which may be acceptable in French, look odd in an English book where nothing can excuse the dreadful word "Laotian." "Wellesley Province" offends the practised eye, while to the uninitiated "Tale Sap" will not

look much like "Thalay Sa'p." The book is illustrated with excellent photographs taken during the journey, has four useful maps, and a good index.

W. A. G.

RACES OF AFRICA. By C. G. SELIGMAN. (The Home University Library.) *London: Thornton Butterworth* 1930. 7×4 *inches; 256 pages; and maps. 2s 6d*

This new volume (No. 144) of the 'Home University Library of Modern Knowledge' is an admirably compendious introduction to a very comprehensive subject. The general reader will be grateful for the introductory chapter containing the necessary explanation of points in physical anthropology, an explanation far too often taken for granted. Professor Seligman has succeeded in the difficult task of presenting in a very readable form the enormous mass of information packed into his ten chapters; and the two maps make quite clear the distribution of language-families and the physical features of the continent which have had so decisive an influence on the migrations of tribes. The classification adopted (Bushmen, with Hottentots and Negritos; Negroes, including "True Negro" and Bantu; Hamites; Half-Hamites and Nilotes; Semites) seems entirely satisfactory, according to the latest authorities. Perhaps we may be allowed to question one or two points of detail, for instance the assertion (p. 220) that the "Nyika" tribes "are not totemic." According to information supplied by Sir Claud Hollis, some of the Giryama clans have as their totem the *Kasiji* (a small blue finch), another the *Ioma* (ant-bear). "Wasambara (Bondei)" on p. 219 is certainly misleading, even if not intended to convey the fact that both names apply to the same people. In the Bibliography at the end of the book, Vedder's 'Die Berg Dama,' L. Schultze's 'Aus Namaland und Kalahari,' and Miss Bleek's recent Bushman studies should surely have been included in view of the dearth of literature in this particular direction.

The map on p. 184 shows at a glance the provisionally useful, though admittedly rough, division of the Bantu into Eastern, Southern, and Western—which has not hitherto, so far as the reviewer is aware, been dealt with in any English work.

A. W.

BIG-GAME HUNTING AND COLLECTING IN EAST AFRICA, 1903–1926. By KÁLMÁN KITTENBERGER. *London: Edward Arnold & Co.* 1929. 10×7 *inches;* xx+348 *pages; illustrations and map. 25s*

The author of this work is a professional hunter, also a collector of dead and living animals for the Hungarian National Museum and Zoo. His professional work took him on five expeditions to Tanganyika, Kenya, Uganda, and the Congo, the first made in 1902, the last in 1925. His book is a narrative of hunting and observation made on these successive expeditions. It contains an immensity of sound information on the habits and distribution of the African game. It is full of incident and exciting adventure. We are told how the author was charged by a lion and escaped after being badly mauled. But the incident which surely must be unique is the performance of a Caesarian section on a rhinoceros; the foetal calf was successfully extracted, dealt with as a maternity nurse would treat an infant, and kept alive for six days. Mr. Kittenberger writes from great experience. Moreover he is a good field observer and describes his experiences in an attractive way. He gives much information on native methods of hunting, some of which show extraordinary audacity, as for example where the natives of Uganda will gallantly attack a leopard with clubs. He writes with particular authority on the methods of capturing wild animals alive; how a young rhinoceros can be collared like a footballer in a rugby match, how leopards and hyaenas can be taken in spring traps and antelopes in loop nets. Lions, we are told, must, without excep-

tion, be taken only as cubs. Animal colour, of course, gets its share of attention, and it is interesting to know that this acute observer considers that the spotted and striped animals melt completely into their surroundings when observed in certain lights. One cannot but sympathize with him in his many losses: at one time his diaries, at another his collections; but, most serious of all to him, his loss of liberty, when, as a prisoner of war in India, his rifle was replaced by the rubber catapult. R. W. G. H.

OPEN-AIR STUDIES IN AUSTRALIA. By FREDERICK CHAPMAN. Foreword by Sir EDGEWORTH DAVIS. *London: J. M. Dent & Sons* 1929. 8×6 *inches;* xx + 170 *pages; and illustrations.* 10*s* 6*d*

This book deals with a great variety of subjects from Australia and the Australian seas; and in writing of them the author has skilfully drawn upon the work of the foremost scientists so as to illuminate new problems. There is no suspicion of "insularity," for references are constantly made to similar or contrasted examples in other lands, especially in Great Britain.

The author himself combines wide scientific knowledge with a simple and attractive style. The accounts sometimes seem rather scrappy and inconclusive, but such defects are perhaps inseparable from popular writing of this kind.

E. W. S.

NEW ZEALAND IN THE MAKING: A Survey of Economic and Social Development. By J. B. CONDLIFFE. *London: George Allen & Unwin* 1930. 9×5 *inches;* 524 *pages; maps and diagrams.* 15*s*

This is an excellent book, the fruits of many years of research in New Zealand. The treatment is brief for the earlier periods, but commendably full for the last forty years, precisely the period for which comprehensive works are lacking. There is little that is professedly geographical: a section of four pages, entitled "The Geography of Development," and an occasional reference to climatic effects, as for example in the growth of the pastoral industry, are all that can be found. But if there is little explicit geography, there is much implicit; and apart from the sense of geographic values that lies behind the work, there is much factual material of great value to the geographer. One would mention specially the chapters on The Economic Status of the Maoris, The Alienation of the Land, The Rise of the Pastoral Industry, An Economic Transformation (the rise of the North Island to leadership in both the sheep-rearing and the dairying industries), and The Triumph of the Freehold. Three new maps, unfortunately of very small scale, are of great interest: land utilization, land tenures, and the distribution of the Maori tribes when colonization began. Finally, an appendix gives a very full list of references to each chapter. In the last chapter, entitled "An Experiment in Democracy," the author surveys present tendencies in the social life of the country. He is here on highly controversial ground, and his anticipation of criticism in New Zealand will probably not be disappointed. His criticism of the education system, particularly of the University, and his estimate of the intellectual life of the country can scarcely expect to pass unchallenged. Nevertheless it is a book that no serious student of New Zealand history, economics or geography can afford to neglect. R. O. B.

ETHNOGRAPHY. By L. HAVEMEYER. *Boston and London: Ginn & Co.* 1929. 10×6 *inches;* vi + 522 *pages; illustrations and sketch-map.* 21*s*

It is undeniable that a good elementary text-book on Ethnology is a great desideratum. There is the mere outline which is of little use to any one who has no previous knowledge of the subject, and there is the book which tries to include everything, enters into technical details, and controversial matters, often leaving as a

result a sense of uncertainty and confusion. Prof. Huxley once said that his object in writing an elementary text-book was to act the part of a sieve, so as to separate what was certainly known from the uncertain and controverted. The result was a synthetic masterpiece which was of inestimable value to the students of the subject. The author in writing the book before us apparently had a somewhat similar aim. But instead of expressing and summarizing the knowledge which may be regarded as certainly established in his own language, he has preferred to present it in the form of quotations and extracts from numerous authors who have written on ethnological topics. Classifying the races of mankind under the five heads of Black, Brown, Red, Yellow, and White, certain authors are quoted at length to explain the mode of life, religion, and social organization of each, and the reader is left to form his own conclusions therefrom. The author thus avoids the responsibility of synthetizing, forming judgments, or committing himself to any personal views. But he is responsible for the choice of the peoples selected to represent the several races, and for the authors chosen as authorities. Therein lie the weaknesses and limitations of his work. His authorities are by no means always first hand. For example, in treating of the "African Blacks," the accounts of Bushmen, Hottentots, and Zulus are almost wholly taken from Ratzel's compilation 'The History of Mankind.' Again, in the case of the Australian aborigines the same source is used as well as other compilations. Though here the high authority of A. W. Howitt is quoted at length, the epoch-making researches of Spencer and Gillen are not even mentioned.

Adopting the unjustifiable term "Red" race for the natives of America north of Mexico, two-fifths of the book is allotted to them. Allowing some grace to an American writer, this can hardly be defended in a work professing to treat of ethnology generally. The Eskimo are thus included in the Red race, and the account of them consists almost wholly of extracts from Nansen's 'Eskimo Life.' Estimable as this is it is necessarily restricted, for, if we mistake not, Nansen was brought into intimate contact only with Greenlanders. A long series of extracts from H. H. Bancroft, Prescott, and Garcilano de la Vega gives a fairly good, if brief, account of the Aztecs and Incas.

The most curious feature of the book is the treatment of the Yellow and White races, for the former is represented by the Tibetans and Yakuts, the latter by the Hindus. No sufficient explanation is given why these peoples are chosen as representatives of the two most important divisions of mankind. That the Hindus, in whom there is undoubtedly a Dravidian strain, should be selected as the sole example of the White race borders on the grotesque.

Apart from these criticisms and accepting the authorities quoted, the extracts are on the whole well chosen, being for the most part clear, definite, and to the point, and they supply a large amount of useful and reliable information. As a beginner's reading-book in ethnology this volume forms a decidedly interesting and instructive introduction to the study of that science. The appended Bibliography is remarkable for the absence of any mention of many leading authorities in all departments of ethnology. E. A. P.

LA VIE HEROIQUE ET ROMANTIQUE DU DOCTEUR CHARLES CUNY, EXPLORATEUR (1811–1858). Cuny et Flaubert. By HIPPOLYTE ROY. *Paris: Editions Berger-Levrault* 1930. 10×7 *inches;* xviii+266 *pages; illustrations and map.* 25 *fr.*

Cuny, who was born in 1811, was destined by his humble peasant parents for the Church, but the prospect appealed little to him and he abandoned it for medicine. Attracted to Egypt, like many other young Frenchmen of the period, he entered the service of Muhammad Ali in 1837, and acted as surgeon to his troops in Egypt,

Syria, and Mesopotamia. While in Egypt he married a rather remarkable young woman who, although the child of an Abyssinian mother, had been born at Nortap, in Flintshire. In 1857 Cuny set out for Darfur accompanied by his ten-year-old son. He travelled overland from El Dabbe on the Nile due south to El Obeid and thence to El Fasher, where he died. Little is known of the circumstances of his death, but it has always been suspected that he was murdered.

Cuny was a careful observer and made interesting notes on the tribes he met on his last journey and on the flora and fauna of the desert. Part of the journal containing these notes he sent back from El Obeid, and it was subsequently published. M. Roy has collected into his memoir a mass of material relating to every aspect of Cuny's life. Considerable prominence is given to his association with Flaubert, whom he met on the Nile in 1850. E. W. B.

THE WORKS OF SAMUEL DE CHAMPLAIN. In six volumes. Reprinted, translated and annotated by six Canadian scholars under the general editorship of H. P. BIGGAR. Volume iii, 1615–1618. *Toronto: The Champlain Society*, 1929. 10×7 *inches;* xvi+418 *pages; facsimile illustrations and map*

This volume of the Champlain Society's scholarly edition of the 'Voyages' consists of two separate Parts. Part I contains the French text and a new translation by Mr. H. H. Langton of the very rare 'Voyages et Discovvertvres Faites en la Novvelle France,' 1615–1618, which was first published in 1619. In Part II we have the first two books of the first part of 'Les Voyages de la Novvelle France Occidentale, Dicte Canada,' which dealt with all the discoveries made in the period 1603–1629, and was first published in 1632. Since these books form a *résumé* of the 1613 volume already translated by Prof. W. F. Ganong for vol. i of this series, the same translation has been used. The French texts in both cases have been collated by Prof. J. Home Cameron.

Of the two Parts the first is naturally much the more interesting, especially since it includes Champlain's account of his great journey of exploration into the Huron country in 1616–17. It will be remembered that during this journey he reached Lake Huron by the Ottawa–Lake Nipissing route, which was destined to become so important later, and subsequently crossed by Lake Simcoe to Lake Ontario, and took part in the unsuccessful attack upon an Iroquois stronghold, during which he was wounded. He was compelled to winter with the Hurons, and did not get back to the St. Lawrence area till the summer of 1617, having started in early July 1616. His narrative, published not long after the events described, retains all its first freshness, and gives an extraordinarily vivid account of the life of the Hurons and of the nature of their lands. Part II is more propagandist and didactic, and it is only occasionally that the author is able to forget his secondary aims, and recapture some of that enthusiasm which gives fascination to pioneer books of travel.

The notes, dealing mainly with the identification of place-names and plants and animals, are a great help to intelligent reading, and the volume is beautifully illustrated, the plates including Champlain's large map of 1632.

The editing has been extremely careful; but a few small points may be noted. For the benefit of readers on this side of the Atlantic some further details would have been welcome in the notes on the plants and animals mentioned, especially since in America names familiar in this country are often applied to forms with not more than a superficial resemblance to those of Europe. For example, Champlain's account of the fish of Lake Huron is not annotated, and it would be interesting to know which of the lake fish is meant by the "certain kind of sturgeon," described as "marvellously good to eat." In the note on p. 205, *Arenaria peptoides* is presumably a misprint for *Arenaria peploides*, and the phrasing seems

to imply that this sea-purslane is identical with sea milkwort (*Glaux maritima*). On p. 125 there is a note on the "febues du bresil" of the text (translated as "red beans"), in which it is explained that *bresil* probably refers to the colour of the flowers, and has nothing to do with Brazil, except through the association with logwood, and thus with a reddish tint. But on p. 375 "febves de Bresil" is translated "Brazilian beans," with no note or cross-reference. The point has some importance, because the two meanings of the French word have often been confused, with unfortunate results, and it is undesirable to give the confusion further currency.

Such minor points must not, however, be taken as diminishing the debt of gratitude which we owe to the Champlain Society and to the general editor, for this opportunity of renewing acquaintance with the works of the great Frenchman in such an attractive edition. M. I. N.

JOHN FRANKLIN'S BRIDE: ELEANOR ANNE PORDEN. By Hon. Mrs. GELL. *London: John Murray* [1930]. 9×6 *inches;* xx+311 *pages; and illustrations.* 15*s*

Eleanor Porden's married life lasted less than two years: her whole acquaintance with Franklin extended to less than ten. Apart from the light they throw upon his character, the letters printed in this book, therefore, do not contribute much to his biography. Husband and wife were strongly contrasted characters: she, though a constant attendant at the scientific lectures of the Royal Institution, whence she reported the latest magnetic theories to Franklin, was a poetess of some contemporary fame, a member of a literary group known as the "Attic Chest," and the centre of a small *salon*—in fact, a not inconsiderable blue-stocking. Many of the letters before their marriage are given up to discussions of their religious views, the fitting observation of the Sabbath, and whether Eleanor was to be permitted to continue her literary work. Franklin vigorously defended himself from the charge of being "unsocial," though his sociability would not extend to a young lady who stayed from church to read Scott's novels. With their frequent allusions to current events, many of which have a topical appropriateness to-day, these letters were certainly worth publishing, and the reader will obtain from them a clear and pleasing impression of the bride who, though threatened with a mortal illness, successfully insisted upon her husband embarking once more for the Arctic.

BÜCH DER LÄNDER. Das Buch Fremdland. By EWALD BANSE. *Berlin: August Scherl* 1930. 9×6 *inches;* 498 *pages; and diagrams.* 10 *Marks*

The first volume of this work, dealing with Western Europe, was reviewed in the *Journal* for November 1929. The present volume covers the remainder of the world. To compress this survey into a volume approximating in size to the former presented considerable difficulties, but the task has been lightened by the author's view-point. Herr Banse's interests lie in the areas settled wholly or in part by emigrants from Western Europe, and he devotes about half the book to them: of the remainder, the greater part is concerned with the three ancient cultural homes, the African and Asiatic "Morgenland" and the Far East. The remaining division of importance is the "Black and brown tropics." This scheme is convenient, except for Africa, which is treated in three sections in various parts of the book—South Africa (Europe overseas), Negro Africa, and the African "Morgenland."

As his sub-title shows (Landschaft und Seele der Erde), the author gives considerable prominence to the peoples and their social life. If Australia be selected for special notice here, it is mainly because there his conclusions seem most open to question, for on the whole he maintains an impartial judgment, and brings out

characteristic features clearly. Australia is grouped with South Africa as "Germanisches Südland" and allotted slightly more than fourteen pages: of these, one-ninth are given to the aboriginal inhabitants, who, though of interest in themselves, play little part in modern Australia. On the other hand, more important factors, such as the artesian basin and communications, are not mentioned. Regarding the white population, he characterizes its elements as 40–50 per cent. "convict," an equal proportion as "adventurers," and 10–20 per cent. as "civically well-disposed." Upon this analysis he proceeds to found a severe criticism of the Australian character. This may not be worth combating, but his figure of 200,000 transported convicts is too high, and he is wrong in stating that "free" immigration set in only in 1851. During the years 1832–50 about 120,000 assisted and unassisted immigrants landed in Australia. It must also be remembered that of the 100,000 convicts transported before 1836, 13,000 only were women.

In a similar vein to this, he writes sarcastically of the results of the domination of women in American life, particularly the "coining of the half-educated."

G. R. C.

THE CANADIAN GEOGRAPHICAL JOURNAL. Vol. I, Nos. 1 to 3. May–July 1930. *Montreal: The Canadian Geographical Society*. 10×7 *inches; with illustrations and sketch-maps*

The Canadian Geographical Society was founded on January 17. It may be congratulated on its achievement in producing by the first of May, and thenceforward punctually each month, a Journal which in the beauty of its illustrations, the liveliness and agreeable variety of its letterpress, and the efficiency of its business organization, will make it a serious competitor of its famous rival across the border. The first number deals with the Governor-General's tour in the West Indies; an Arctic Patrol illustrated by the author's drawings; an article on Canadian birds with coloured plates from the Bulletins of the National Museum at Ottawa; an account of the Society's aims by its President, Dr. Camsell; an account of the Tibet Mission of 1903–04 with a striking portrait of Sir Francis Younghusband by the Still Division of the Canadian Government Motion Picture Bureau; an interesting account of Canadian air surveys; Arctic wild flowers; and Titled Farmers of the Canadian West.

The second number begins with A Quebec Sketch Book with clever drawings by the author, Esther Brann, reproduced in colour; there is an article identifying the Indian "paradise" of Temlaham; a "Fragment of China" and a "Look at London"; and an account of Dr. Ami's researches in French prehistory. The third number has an article on Baffin Land by Mr. Soper; on Grand Manan; on a Festival at Calgary; and a handsome section in photogravure on tinted paper, with notes on the Canadian National Parks by Mrs. J. A. Wilson.

The Journal is published by the Woodward Press Limited in Montreal, though the headquarters of the Society are at Ottawa. It sometimes, by oversight, calls itself a Magazine: which is explained by the statement on the foundation of the Society that "through the generosity of one of our Members a magazine has been acquired." It is "dedicated to the interpretation, in authentic and popular form, with extensive illustration, of geography in its widest sense . . ." and with the modest subscription of three dollars for Society and Journal its popularity is assured.

THE MONTHLY RECORD

BRITISH POLAR EXHIBITION

The British Polar Exhibition was held in the Central Hall, Westminster, from July 2 to 19 last. A note upon its organization appeared in the *Journal* last month. During its run, lectures on Polar exploration and technique were given by Mr. V. Stefansson and Commander L. C. Bernacchi, and the film of the second Scott Expedition was shown. A Polar Handbook with varied articles upon the scientific aspect was also issued. The exhibition was carefully arranged, labelled, and catalogued. A prominent exhibit was the Antarctic Camp Scene, designed by Commander Bernacchi, in which a tent, sledge, and other equipment used on the *Discovery* expedition were displayed against an appropriate panoramic background of the Barrier and Mount Erebus.

The exhibits were of two classes—historical relics of Polar explorers, and modern scientific apparatus contributed largely by the *Discovery* Committee of the Colonial Office. The work of other bodies such as the Moravian Missions among the Eskimo, and the Hudson's Bay Company was also represented. The greater part of the historical relics are now in the keeping of public museums throughout the country, but the opportunity of viewing them in one collection is not likely to recur. Exhibits from private collections included two sketches by Dr. Wilson, one of a Norwegian flag found flying 13 miles from the Pole, lent by H.M. the King from the Royal yacht. There was also the boat in which Sir Ernest Shackleton and his five companions made the voyage from Elephant Island to South Georgia to bring relief to the remainder of the crew of the *Endurance*. This is now in the possession of Dulwich College, the gift of Mr. Rowett, as is also the sledge used by Shackleton on his farthest south journey in 1908. The painting of Captain Oates, "A very gallant gentleman," by J. C. Dollman, was lent by the Cavalry Club. Personal relics included those of the *Alert* Arctic expedition of 1875, lent by Admiral Sir George Egerton; of the Jackson Harmsworth Franz Josef Land Expedition, 1894–7, lent by Major F. G. Jackson, including sledge and dog harness used; of Captain Scott, lent by Lady Hilton Young, his camera, Union Jack hoisted at South Pole, etc.; and groups of medals and relics lent by survivors of various expeditions.

Among the public collections represented were: Hull Corporation Museum (paintings, documents, and other objects illustrating the whaling industry of the late eighteenth and early nineteenth centuries); the Royal Naval College, Greenwich (Franklin relics); the British Museum (Scott's Journal, Wilson's Diary, etc.); the Cheltenham Municipal Museum (Dr. Wilson's personal relics); and the Scott Polar Research Institute, Cambridge. The latter exhibit contained many of Dr. Wilson's water-colour sketches, and the notes and drafts from which they were made; but its main aim was to illustrate problems arising in Polar travel and equipment, and the solutions adopted by various explorers. A curious item was a piece of the haematite rock brought back by Sir Martin Frobisher from "Meta Incognita" on his third voyage, and which was thought to contain gold.

The Meteorological Office exhibit contained Herschel's actinometer, used on Ross's Antarctic Expedition, and scientific instruments from later Polar expeditions, and the British Museum (Natural History) lent the rock specimens found at Scott's last camp. A large number of relics and paintings from the Society's Collections were also shown.

THE SIBERIAN METEOR AND REPERCUSSIONS IN ENGLAND

In the *Journal* for March 1929 (vol. 73, p. 296) there appeared a note on the immense havoc wrought in the Yenisei Basin, Siberia, by a meteor which fell on 30 June 1908. This note refers to one of two papers on the subject that had been published by L. A. Kulik. Recently Mr. C. J. P. Cave, of Petersfield, having read of the great aerial disturbance, drew attention to the fact that the date of this coincided with that of a remarkable series of pressure waves indicated on the traces of the micro-barograph at Petersfield, as well as in London, Cambridge, and other places in England, and which have hitherto remained unexplained, there being nothing apparent in the meteorological situation at the time to account for them. Dr. F. J. W. Whipple, Superintendent of Kew Observatory, subsequently undertook to discuss the whole matter according to the information available, and the result appears in the July issue of the *Quarterly Journal of the Royal Meteorological Society*.

Dr. Whipple's analysis of the micro-barograms leads him to the conclusion that the pressure oscillations in England were of two kinds, some being due to the passage of the meteor through the atmosphere, and others, more violent and sudden, to the impact of meteorites with the ground. According to the local evidence there was a great blast of air directed from the area where the meteorites plunged into the ground, and it is thought probable that the violent oscillation which occurred at the English stations about 5.25 p.m. on June 30 correspond with this blast. Dr. Whipple calculates that the smaller disturbance travelled to this country at the rate of 323 metres per second, the sharp shock at 5.25 at 308, and another of the same kind at 303, and he compares this with 314 for one of the great Krakatoa waves in 1883. He points out that much more light would be obtained about the course of the pressure waves through the atmosphere if more records were available from other countries. In countries nearer the source of disturbance than England the sensitive micro-barograph would not be needed, since the ordinary barograph curves would record it, as indeed was the case at Kirensk and Irkutsk. Had the meteor fallen but five years earlier than it did we should have had no evidence for the spreading of the air waves to England, since the micro-barograph was only invented in 1903, and had it occurred twenty years earlier there would have been no seismograph to demonstrate that earth waves can be generated by the impact of a meteor with the ground.

In the discussion which follows Dr. Whipple's paper Mr. Spencer Russell and Mr. L. C. W. Bonacina lay stress on the wonderful sky-glows and prolonged twilights at the time, adding that the date given by Dr. Whipple immediately recalled the famous occasion of 30 June and 1 July 1908, when night in England failed. For two successive nights it remained as light in the south of England as is normal in the north of Scotland at midsummer. There was no suggestion of aurora and the effect appeared to be simply an intensification of ordinary June twilight. Mr. G. A. Clarke, of Aberdeen Observatory, a keen observer of the sky, in reply to an inquiry as to what was noticed in the north at the time, writes that on referring to his diary he finds an entry to the effect that a sudden increase of light occurred about 10 p.m. on June 30, and that the night was throughout extremely light. This is certainly remarkable, suggesting that the same agency that actually increased the light towards midnight in Northern Scotland was only just able to maintain the light in the deeper midsummer night in Southern England. Similar most abnormal twilight was noted in other northern countries of Europe, and it seems quite impossible not to connect this, as well as the pressure waves, with the Siberian disturbance which devastated an area as big as Yorkshire. At the time, the prolonged twilights were attributed to abnormal refrac-

tion. Dr. Whipple asks for further information on the optical side, whether positive or negative, from other countries.

That twenty years should have elapsed before any serious attempts were made to investigate this extraordinary occurrence is, as Dr. Whipple observes, a mystery.

IDENTITY OF FALLS IN LABRADOR

When Mr. Watkins returned from his recent expedition to Labrador he was unable to reconcile his own surveys with the statement of Dr. Kernan that coming down the "Grenfell River" he had reached the falls discovered by Mr. Varick Frissell and called by him the "Yale Falls" (see *Journal*, 75, 1930, p. 109). It seemed certain that Dr. Kernan must have found a similar pair of falls higher up the river. Mr. Frissell was asked to re-examine the question with Dr. Kernan, and we are glad to receive from him, in a letter from New York dated 14 July 1930, a full acceptance of this conclusion. He writes: "Several days ago Dr. Kernan, of New York City, and I met to decide what conclusion we could reach concerning the Grenfell River region, based upon the facts at hand. You will remember that in 1925 I ascended the river with a local trapper from a point about 12 miles below the falls. A year later Dr. Kernan led an expedition from the St. Lawrence across the height of land through Lake Ossokmanuan descending Grenfell River, to a set of falls which he assumed to be the same ones we had discovered. It remained for Mr. H. G. Watkins's expedition in 1929 to correlate whatever information had been gathered by these two expeditions. I personally agree with Mr. Watkins in his very interesting article in last January's Journal to the effect that there are two sets of falls, and Dr. Kernan reached the upper set, mistaking them for those I had previously found several miles farther down the stream. This fact became obvious the other night when we again compared the moving pictures Dr. Kernan took of his falls with the ones I had made a year before. After careful comparison we now realize that the falls are not the same but two different sets. However, they are so similar that it can easily be understood how Dr. Kernan's party made the mistake in believing they had reached Yale Falls. They no doubt would have continued down stream and discovered their mistake except that it was late in the season and a snowstorm made them decide to retrace their steps to the Ashuanipi Branch of the Hamilton, make the Big hill portage, and descend down the main route of the Hamilton to the North-West River as quickly as possible."

THE CLIMATES OF ALASKA

A very useful summary of all available information relating to the climate, or rather climates, of Alaska is supplied by Miss Edith M. Fitton (*Monthly Weather Review*, March 1930), which is the more welcome because of the generally hazy notions that prevail about climatic conditions in that Arctic land. Polar ice on the north and west coasts, relatively warm water on the south coast, and high mountains cutting off the interior from marine influences, are the geographical factors which determine wide variations of climate within the limits of the peninsula. Thus the mean annual isotherm of 40° F. touches the south coast, but the north coast is within that of 10° F., the corresponding mean isotherm for January being 30° F. and −20° F., and for July 55° F. and 45° F. The warmest isotherm is the latter month however, 60° F. appears over the continental interior, where the range of temperature is very great, the absolute minimum at Eagle being −69° F. and the absolute maximum +95° F., a difference of 164°. With the cyclonic activity of the North Pacific low-pressure system and the damp oceanic winds blowing against the mountainous south coast, the precipitation is here very

heavy, upwards of 60 inches a year, and at one place, Latouche, as much as 172 inches; but the interior is dry and on the north coast the amount is only 10 inches. Much of this precipitation is of course in the form of snow, and in this Arctic climate the snowfall is heaviest on the Pacific coast, in the region of mildest winters, the aggregate in a year there averaging 100 inches, or some 9 feet. It is also heavy on the Bering Sea coast, 80 inches, but on the intensely cold Arctic coast it is only 40 inches. On this north coast however no month of the year is entirely free from falls of snow, whereas the Pacific coast, where so much falls, is free for four months. The continental interior, which has the warmest summers, is free from snowfall only in June and July, and the Bering Sea coast only in July and August, the difference being due to the sea-ice on that coast which delays the summer warming in comparison with the dry interior. Abundance of cloud and fog, especially on the south and west coasts, keep the amount of sunshine in Alaska rather small, and even during the summer the percentage of the very high possible amount is quite low. But it would appear that this cloudiness may be looked upon by the people of Alaska as something of an advantage, for Archdeacon Hudson Stuck, in comparing winter and summer conditions, is quoted as follows: "To most residents in these latitudes the perpetual sunshine is more trying than the darkness, for there are always three or four hours' daylight on the darkest day, but there is no escape from the glare of the sun, no kindly desert gloom for the hours of repose."

The Archdeacon is further quoted as drawing a vivid picture of the extreme severity of the climate of the Arctic coast. Between 1 and 8 January 1918 there was hardly, he says, a moment's respite from a howling north-easterly blizzard with temperature between $-15°$ and $-30°$ F., and that at a season when the sun never appears above the horizon. For protection against these bitter blizzards most of the native buildings are put partially underground. But he adds that with all its bitterness this Arctic coast of Alaska "is not without scenes of great beauty and even sublimity, and its winter aspects have often an almost indescribable charm."

It is a clear inference from Miss Fitton's study that although the Pacific coast of Alaska is warm for its latitude, the climate of the peninsula as a whole lacks nothing of Arctic rigour. The high St. Elias range excludes the Pacific warmth from the Yukon valley, though sun heating for a few weeks round midsummer causes the temperature at times to rise above 80° or even 90°. In this valley there are forests of birch, willow, alder, and spruce, but though vegetables and certain grains are raised, the summer weather is too precarious for wheat.

FORESTRY IN VICTORIA

In a paper entitled "The Factors controlling the Distribution of Trees in Victoria" Dr. Reuben T. Patton deals with the trees of the State primarily from the point of view of forestry (*Proc. Roy. Soc. Victoria*, vol. xlii, New Series, Part II, 1930). The predominant trees in Victoria are the various species of eucalyptus, though acacia runs it fairly close, and different species adapt themselves to all the different climates found in the State, from the nearly rainless mallee country in the north-west, to the temperate rain-forest country in the south-east. Some even withstand the heavy winter snows at altitudes of 6000 feet. As a general rule the areas, like the Melbourne district, with an annual rainfall below 30 inches, are claimed by agriculture rather than forestry, though in these regions valuable forests of *Eucalyptus sideroxylon* occur. In areas with an annual rainfall between 30 and 40 inches geology and soil are the determining factors in the use of the land, whilst in those where the rainfall exceeds 40 inches forestry has first claim. The term "forestry" in Victoria is understood to include

not only timber production but also water conservation in relation to the protection of the great gathering grounds of the irrigation systems so vital to agriculture. The area of the State having a rainfall of over 40 inches is only 14 per cent. of the total, and of this 14 per cent. only a fraction is carrying trees of economic value. Geological factors exercise an enormous modifying influence on the climatic features, and though much of this 14 per cent. is at present waste, there is every prospect that a further knowledge of the laws of tree distribution will enable fuller use to be made of this climatically favourable area. Whereas in the wet regions where the trees enjoy a rainfall favourable not only in quantity but also in distribution and reliability, the timber is tall and assumes a tropical appearance; in the dry areas, where all three aspects of the rainfall are unfavourable, the forest assumes the peculiar xerophytic form known as "mallee," and has to be able to withstand the lowest quantity of rain that periodically occurs.

It appears that here the trees are unable to profit much from seasons of more favourable rainfall, since drought-resisting structures, whilst reducing transpiration, also limit vegetative processes and the building up of carbohydrates. In these dry regions the summer heat is very severe, the maximum temperature being commonly above 100° F. in December, January, and February, and sometimes above 110°.

ALLEGED FALSIFICATION OF LATITUDES BY COLUMBUS

Professor Magnaghi returns to this question, with special reference to Dr. Williamson's review of his former article (see *Journal*, March 1930, p. 263) in the June number of the *Bollettino* of the Italian Geographical Society. It will be remembered that while both writers agree that it is unthinkable that errors of over 20° in latitude should be due to incompetence on the part of the navigator, Professor Magnaghi explains them as intentional falsifications, while Dr. Williamson, like some previous commentators, ascribes them to errors in copying the Journal of the voyage; holding that, with the details there given of the courses sailed, the falsification of a few latitudes could really deceive no one. Weighty as this objection may seem, Professor Magnaghi does not allow that it outweighs the many considerations on the other side. He thinks that, in view of the secrecy observed in regard to the copying, this would be done by a trusty person who would not fall into errors of carelessness. (Yet would not the very ignorance of State affairs on the part of a chance scribe, if such were employed, be in some ways a safeguard?) Of more weight perhaps is the fact that the mistakes in regard to figures seem practically confined to the four latitudes in question, and that in three of these an identical mistake has been made. Moreover the details added by Columbus seem intended to underline, as it were, the wrong figures, for he compares them with those for places in the Old World, and in one passage gives the length of the day exactly as he would find it, for the erroneous latitude, in the ephemerides and maps then available.

Abundant motives for falsification by Columbus are held to have been present. To have confessed that his course had taken him to the latitude of the West Indies would at once have brought Spain into conflict with Portuguese claims to everything south of the latitude of the Canaries, and there is full evidence of nervousness on the part of Spain lest her schemes should be upset in this way, to guard against which possibility was the object of the appeal to the Pope. Even the Spanish sovereigns found it difficult to gather from the Journal just where Columbus had been, and his aim seems to have been to suggest that he had almost reached Cathay, by giving figures that would harmonize with such a claim. If the true facts had been known his honours might have been in jeopardy.

In regard to the La Cosa map, Dr. Williamson himself ascribed its false lati-

tudes to a desire to hoodwink the English, and Professor Magnaghi asks why these should have been more easily duped than the Portuguese, and whether also their rivalry was serious enough to call for such a step. Moreover the position held by La Cosa was hardly such as to permit him to falsify the map on his own responsibility.

Professor Magnaghi considers the question a crucial one for the fame of Columbus. He would rather, he says, regard him as a "diplomat" (and such tricks were part of the stock-in-trade of the diplomacy of the time) than as a seaman capable of such elementary mistakes as have been attributed to him. To those who have cast doubt on the navigator's competence he replies by instancing the way in which his instructions, given on sailing on the second voyage, enabled all the ships to reach the appointed rendezvous in Haiti.

While thus summarizing the chief points in Professor Magnaghi's argument, we cannot help thinking that the question must still be regarded as open. Surely there are traces of inaccuracy in the Journal besides the wrong latitudes, as well as possibilities of interpolation, seeing that it has certainly not come down to us as Columbus wrote it. With the latitude of the Canaries known as 28°, and the clear statement that the course sailed thence was west and south-west, it is difficult to see how Columbus could hope to deceive the Portuguese by putting Cuba in 42°. Moreover it is by no means firmly established that they claimed everything south of the latitude of the Canaries. The La Cosa falsification is supported by much better evidence, for Spain definitely protested that Cabot had been trespassing on ground explored on her behalf, and the La Cosa map gives on paper what the ambassador said orally. But any definite conclusion seems impossible where so much is guesswork.

OBITUARY

MR. FRANK BURNETT, LL.D.

We regret to record the death in February last of Mr. Frank Burnett of Vancouver, aged seventy-eight. After spending some years at sea and farming in Western Canada, Mr. Burnett, a Peterhead man, settled in Vancouver in 1895. His health breaking down, he fitted out a yacht and spent much time cruising among the Pacific Islands. These cruises aroused his interest in native life, and he became an enthusiastic collector of ethnographical objects. Later he presented his collections to the University of British Columbia, who conferred upon him an honorary degree of doctor of laws. Mr. Burnett described his travels in several books, including 'Through Tropic Seas' (1910) and 'Summer Isles of Eden' (1923). He had been a Fellow of the Society since 1925.

MEETINGS: SESSION 1929–1930

Annual General Meeting, 23 June 1930. The President, Colonel Sir Charles Close, in the Chair.

In presenting the Medals and Awards the PRESIDENT said: I would remind you that the two Royal Medals are of equal dignity and distinction.

The Founder's Medal is awarded to Mr. F. Kingdon Ward for his geographical explorations and work on botanical distribution in South-West China and South-East Tibet.

A long series of papers in the *Geographical Journal* from the first in June 1912 to the latest in May of this year record Mr. Kingdon Ward's explorations and surveys in those districts. The collection of plants and their seeds and the study of plant distribution has been the principal object of his journeying, and to most men that would have been sufficient occupation for laborious days and nights. Mr. Kingdon Ward has the great merit that he has always taken upon himself the additional and, in the circumstances, considerable labour, of surveying the very difficult and almost unknown country in which he has been working. Further, he has always kept in mind the geographical indications of his plant distributions, and his theories on the tectonics of the Chinese–Tibetan borderland demand the careful consideration of all students of geomorphology. His most striking journey was made in 1924, when with Earl Cawdor he went nearer to completing the traverses of the Tsangpo Gorges than had ever been done before. Some of the most beautiful photographs in the collection of the Society were the product of that enterprise, as was also the seed of *Meconopsis Baileyi*, the blue Tibetan poppy, which has been such a striking addition to our gardens since 1926, when it was first shown at Chelsea.

Mr. F. KINGDON WARD: In thanking you, Sir, for this handsome presentation, may I say what a very great pleasure it is to me to have received this distinction from the Society during your tenure of the presidency. Amongst my belongings I have two books, I think the only two which have been with me on practically every journey I have made. One is a volume of Shakespeare's plays; the other is a book which the President knows even better than the former volume—a book on Topographical Surveying which Sir Charles wrote many years ago. There is always a slight danger, I suppose, when one achieves an ambition, that one will think nothing more need be done in that direction. I am glad to think, as I am not sufficiently clever to become a theoretical geographer, that I am not too old to do a little further travel, and I shall try and regard this Medal, Sir, not merely as a reward for the journeys which I have made in the past, but as a stimulant to future work.

The PRESIDENT: The Patron's Medal is awarded to Mr. Carsten E. Borchgrevink for his pioneer Antarctic Expedition of 1898 to 1900, which was the first to winter on Antarctic land, the first to land upon and travel over the great Ice Barrier, and the first to obtain definite proof of the recession of the Barrier ice since its margin was charted by Ross.

When the *Southern Cross* returned, this Society was engaged in fitting out Captain Scott to the same region, from which expedition much was expected, and the magnitude of the difficulties overcome by Mr. Borchgrevink were underestimated. It was only after the work of Scott's Northern Party on the second expedition of 1912, and when that was discussed in the Reports of the *Terra Nova* expedition, recently completed, that we were able to realize the improbability that any explorer could do more in the Cape Adare district than Mr. Borchgrevink had accomplished. It appeared then that justice had not been done at the time to the pioneer work of the *Southern Cross* expedition, which was carried out under the British flag and at the expense of a British benefactor. Lapse of time could not be considered a bar to recognition. Mr. Borchgrevink may feel some satisfaction in remembering that the recognition of the important geographical work of Hooker, of Wallace, and of Doughty was long delayed, but that the recognition when it came was all the more cordial. I can assure Mr. Borchgrevink that in presenting this Medal to him we do cordially welcome him and congratulate him on the wonderful work he did so many years ago.

Mr. CARSTEN E. BORCHGREVINK: In expressing my appreciation of the receipt of the Patron's Medal from this the greatest geographical society in the world, I

may say I feel especially pleased to express my gratification, because I had the honour of being entrusted with the Union Jack presented to me by His Majesty the King when he was Duke of York. Naturally, having carried out an expedition under the British flag I am all the more proud, on behalf of myself and my gallant followers, to have received this Medal. Perhaps I may be allowed to quote the line from Virgil which seems to fit the occasion, at least so far as my own feelings are concerned: "*Felix qui potuit rerum cognoscere causas*." I think any explorer must find his reward in feeling that he has removed, perhaps, some of those dangers and difficulties which his successors would otherwise have had to overcome. Finally, I am sure I may express the hope that the results of this expedition, gathered by the efforts of representatives of two sea-faring nations, may help to further cement that goodfellowship and understanding which exists between the two nations—the British and the Norwegian. I thank you, Sir, for the kind words you have spoken in presenting the Medal to me.

The PRESIDENT: The Victoria Medal is awarded to Monsieur Emmanuel de Margerie for his distinguished contributions to the Science of Land Forms.

As long ago as 1888 he published with Albert Heim an outline of the dislocations of the terrestrial crust, and the same year with General de La Noë a work on the forms of the land surface. He has worked incessantly in the elucidation of those problems of geomorphology which are of equal importance to the geographer as to the geologist. He spent many years in supervising the translation of, and in copiously annotating, Suess's 'Das Antlitz der Erde,' published under the title of 'La Face de la Terre.' Since 1895 he has been a director of *Annales de Géographie*, and this year he has published a careful and very useful analysis of Sven Hedin's work on the orography of Tibet. The Victoria Medal is given especially for scientific studies rather than for exploration or discovery. The high place which M. de Margerie now occupies in the records of geomorphology makes him a most worthy recipient of this medal.

M. EMMANUEL DE MARGERIE, speaking in French, expressed his appreciation of the high honour that had been done him.

The PRESIDENT: The Murchison Grant is awarded to Colonel H. Wood, R.E., for his surveys with the Tibet Mission and the De Filippi Expedition to Central Asia.

On the return of the Mission he accompanied Colonel Ryder in 1904–5 from Shigatse to the source of the Tsangoro, carrying the triangulation with many difficulties and discomforts to above 20,000 feet. On the Survey of India he had the reputation of being an exceptional observer and a remarkable computer, who during the course of a Sunday would duplicate the work of his staff of computers done during the whole of the week. That was a sort of holiday task! Such repute in the Survey of India made him obviously the right man to command the Survey of India detachment which went with Dr. De Filippi's great expedition to the Karakoram, and which has contributed so much to that question of Himalayan ranges which is now under active discussion in our Society, and, I might add, elsewhere. Colonel Wood is unfortunately unable to be present this afternoon. I will ask the Honorary Secretaries to transmit to him the cheque and the certificate of the Award.

The PRESIDENT: The Back Grant is awarded to Mrs. Gordon-Gallien for her expedition to the Kalambo Falls. The Society will remember how we received photographs of the falls which were well known locally at the southern end of Tanganyika, but which did not appear upon any map. The history of Mrs. Gordon-Gallien's expedition is, briefly, this. She is a very keen traveller and explorer and she asked me one day if there was not a job of work she could do for the Society. I bethought me of a waterfall I happened to miss about thirty or

forty years ago in the middle of Africa and which had since been found, though the region had never been properly explored, and we knew practically nothing about the geology of it. Therefore I suggested to Mrs. Gordon-Gallien that if she could manage an expedition to that spot it would be a really useful piece of geographical work. She thereupon fitted out an expedition, took with her a geologist and a surveyor, and managed to accomplish a very admirable piece of work for which she has been awarded by the Society the Back Grant. I have the greatest pleasure in handing to her the Certificate and the piece of silver plate which she has chosen.

Mrs. GORDON-GALLIEN: I thank you, Mr. President, and the Society very much indeed for this award. I feel I share it with my companions, Mr. Cornwall and Mr. Rose, and I hope everybody will regard it as a reward to them also. Thank you very much indeed.

The PRESIDENT: The Cuthbert Peek Grant is awarded to Mr. Owen Lattimore for his travels in Mongolia and Chinese Turkistan.

The great interest of those travels was strikingly revealed when he delivered the Third Asia Lecture in 1928 and also by the remarkable book which he afterwards wrote. We are glad to know that he has returned to Mongolia, and since the Cuthbert Peek Grant is by the terms of the trust to be awarded to those who intend to pursue active geographical work in the field, it could not have had a more worthy recipient. I will ask the Honorary Secretaries to transmit to Mr. Lattimore the cheque and the certificate of the Award.

The Gill Memorial is awarded to Lieut.-Colonel Reginald Schomberg, D.S.O., for his explorations in the Tarim Basin and the Tien Shan, which he has so recently described to the Society. His scientific curiosity in the geography of Asia has led him to spend these last years since his retirement from the Army in solitary journeys in Central Asia. He patiently sets himself to solve the problems which have been left by other travellers, and it was only an accident which required surgical care which brought him back to England for a few months, during which time we had the pleasure of hearing him. He is now on his way again to Central Asia to continue his work.

The PRESIDENT then delivered his Anniversary Address, which is printed on p. 97.

The visitors having withdrawn, the Annual Report of the Council was presented to the Meeting. Mr. H. F. S. Burgess expressed dissatisfaction with the form of the Financial Statement, and was understood to propose that two Fellows should be appointed by the Meeting to examine the points which he wished to raise. The President said that by the Bye-Laws no resolution could be passed at the Meeting, but that any resolution handed in must be read and referred to a Special General Meeting if it were supported by forty Fellows present. No Motion was put in writing and handed in, and the President declared the Report received by the Meeting.

The President appointed Mr. Hugh Ruttledge and Mr. C. E. A. W. Oldham to act as Scrutineers of the Ballot for the President and Council for the ensuing year, and after the Ballot had been taken they reported that the Candidates proposed by the Council had been elected by the Meeting (see List, p. xii).

The proceedings then terminated.

THE ANNIVERSARY DINNER

The Anniversary Dinner of the Society was held at the Connaught Rooms on Monday 23 June 1930.

The President and Lady Close received the company, which included, among

the Guests of the Society, H.R.H. Prince Damrong and the Princess Boon, The Secretary of State for Air, Her Grace the Duchess of Bedford, Admiral of the Fleet Sir Osmond and Lady Brock, Lord Ritchie of Dundee, General Sir Walter and Lady Braithwaite, Sir Robert Vansittart, The Dean of St. Paul's and Mrs. Inge, Sir Herbert and Lady Creedy, The Provost of University College and Mrs. Mawer, Sir Percy and Lady Shepherd, The Mayor of Westminster and Mrs. Bennett, Mr. and Mrs. Carsten Borchgrevink, Mr. and Mrs. Kingdon Ward, M. Emmanuel de Margerie, and General Warming.

After the loyal toasts had been honoured, the LORD THOMSON (Secretary of State for Air) said: It is my great privilege to-night to propose the toast of a Society whose sole object is the "promotion and diffusion of that most important and entertaining branch of knowledge—geography." I like the word "entertaining" very much, because to me a good map has all the qualities of a good picture and a good book. It is certainly one of the most entertaining things to study. I owe the quotation, which I believe I have successfully pulled off, to the kindness of the indefatigable Secretary, who sent me a large number of pamphlets and notes on the subject of the Royal Geographical Society. All those notes and pamphlets were marked in red ink, "Please return to the Secretary." I am going to confess that I have no intention whatsoever of returning those notes and pamphlets until I have had time to read them. However, I have read enough to inform my mind of one or two important facts in connection with this Society.

One is that this year the Society celebrates its Centenary, and I understand that certain new buildings which owe their initiation to the energy and ground work of the late Lord Curzon will shortly be opened. I have also read about the Founders of this Society—the Burneys, the Barrows, the Browns, the Burtons, the Elphinstones, the Murchisons and other names known to fame. Certainly the creation and the existence of this Society during the last one hundred years has been quite a romance.

I suppose there is a current belief that no great exploration work still remains to be undertaken. In other words, that the bloom is off geographical enterprise. Well, I take it it is unnecessary to remind this audience of recent work and enterprise in that direction. I began just before coming here this evening to read an account of exploration in Southern Arabia, a paper on which, I understand, was read to the Society early during the present month. Anything more fascinating than that account it would be difficult to imagine. There is another geographical enterprise which I believe owes its inception to Cambridge geographers and which is directed to Greenland. There my interest was at once enlisted when some few months back a party of very enterprising young men came to see me at the Air Ministry with the idea of exploring Eastern Greenland in order to establish, *via* Greenland, an air route to Northern Canada, and, ultimately, to the whole of Canada. I was able, I am glad to say, to give encouragement to that enterprise, but, alas! I could not produce any funds. I note however that the Royal Geographical Society, which no doubt has more funds available than the Chancellor of the Exchequer, did make a contribution, and I should like to congratulate the Society on that. Of course that piece of work is going to be of incalculable significance. When an airman can go, we will say in two and a half days, from England to Canada, a great step forward will be made in aerial communication. The advantages to be derived by Canada and the Mother Country from such a facility will be sufficiently obvious to you all.

There are many parts of the world which still remain unexplored, and I would like to think of the assistance that might be given by aviation to future explorers. I dare say some of the pundits at Southampton may think lightly of air survey, but I venture to suggest that as a result of the air survey of Northern Rhodesia,

covering 90,000 miles, which will be completed and the maps printed in less than two years, even the doubting Thomases will be converted. I also think, in fact I almost promise, that the airship is going to be of very great assistance to surveyors and geographers. They will be able to work in a spacious, roomy vessel with every conceivable instrument at their disposal, and be able to hover, almost indefinitely, over the territory being explored.

I think I have said enough to show my interest in this Society and in its work, but before I sit down I should like to say a word about the man whose name I couple with this toast, your President, Sir Charles Close. It has been my good fortune to know Sir Charles for many years. For four years after the South African War we lived in the same Mess at Chatham. Sir Charles was looked upon as the oracle of the Mess. His principal position was with his back to the fire in the ante-room. He being senior to me and most of the others, we dwelt upon his words. I have no doubt that many of you do the same in these days. We have not met since, but I have the very pleasantest recollections of those days. I also, as an old Sapper, like to think of the fact that so many members of my own Corps have occupied the position of President of the Society: Sir Taubman Goldie, Major Leonard Darwin, Sir Thomas Holdich. We Sappers used to think a great deal of ourselves. I trust that the Geographical Society share that feeling.

I have nothing more to say except to propose the toast of The Society and to wish it long life, ever-increasing activity, ever-increasing subscriptions, and still more useful work. With the toast I have the greatest pleasure in coupling the name of your President, Sir Charles Close.

The PRESIDENT (Sir CHARLES CLOSE): I should like, first of all, to thank my old friend Lord Thomson for the kind things he said about the Society. With regard to what he said about me, my impression is that *he* used to stand with his back to the fire! That is the memory that has remained with me, but of course I must correct it now.

It is most appropriate that the Secretary of State for Air should propose the toast of The Society. We feel more and more that our work is lifting into the air, for so many of the explorations of this world are now being done by air. I do not mean to say that that entirely excludes the work of the ground surveyor; the poor groundman who goes about on his flat feet still has his useful purpose. It is not possible from the air to determine place-names, unless they happen to be marked on the ground—that will come, no doubt. One of these days the whole of this world will be developed for the air service. At any rate, we in this Society feel that we must not neglect this new and important method which has already produced results of great interest and value: I think I may say of commercial value.

The Society is not to-night celebrating its centenary, but I should like to be permitted to observe that it is now 99·94 years old, and was founded "to advance that species of knowledge which affords a copious source of rational amusement." That is a quotation of words used by the Raleigh Club in May 1830.

Lord Thomson has referred to the very remarkable expedition that was carried out by Mr. Bertram Thomas this year in which he explored part of that Empty Quarter, the great Southern Desert of Arabia. I think we may say that of all the explorations—and they have been many—which we have had the privilege of studying during the past year, that was perhaps the most interesting, because if any of us were asked: What are the places in this world that have not been explored? the very first answer would be, of course, The Southern Desert of Arabia.

Looking to the future, the most important exploration of which we have immediate prospect is the exploration to which Lord Thomson alluded, Mr. Watkins' expedition to Greenland. That exploration arises from practical requirements.

Those who are interested, as we all are, in the communications of the Empire, feel that it is necessary to ascertain what is the shortest way to Canada. The use of the globes has been given up—more's the pity—for a great many years; but our grandmothers used to study them most attentively. They would have known that in order to take the shortest route from England to Western Canada it is necessary to go through Greenland. Mr. Watkins' exploration is going to carry out the study which will show us where the landing places are possible, what the centre of Greenland is like, find out about the coastal area and so on. That very important exploration is to be in charge of perhaps the best known of our young explorers, Mr. Watkins, to whom we wish all possible success.

Coming down to that part of the world which is known as London, we had an Annual Meeting this afternoon at which two matters of really considerable interest to the Society were settled. First of all, I should like to say how very agreeable it is to me that my successor has been chosen in the person of Admiral Sir William Goodenough. Sir William has two ancestors who have been Presidents of the Royal Geographical Society, and I am a little scared as to whether the Presidency may not become an hereditary institution. The next item of interest to all of us is that the Annual General Meeting to-day, for the first time, elected a lady as a member of Council—Mrs. Patrick Ness.

Our new hall will shortly be finished, and when it is I think all Fellows of the Society, and also all their friends, will find that it is really an admirable addition to the Society's house. We shall have a new hall in which we shall not have all the manifold discomforts which we have suffered from for so many years. I allude particularly to the old Burlington House where I sat for many years on the most uncomfortable benches that have ever been devised.

I have already mentioned that the Society was founded for the purpose of studying "that species of knowledge which affords a copious source of rational amusement," and I might cite one or two brief instances of such amusement. I was once crossing the Salween river, which is not so very far from Siam, and I thought it would be interesting to ascertain how much water there was in that river, and I tried, with very small success, to find out the depth of the river. So I called up the headman of a village on the banks of the river and asked, "How deep is this river?" He scratched himself a great deal and said he did not know. Then he scratched a little more and ultimately said, "Rivers are as deep as hills are high." That is a most delightful generalization. I only wish there were some more in geography.

One other story about the same region. I was in the Shan hills about forty years ago and there happened to be an earthquake. At 4 o'clock in the morning my friend Mangat Rai, a most excellent fellow and a very loyal member of the Survey of India, who used to take down my observations at night, came to me and said, "Sir, there was an earthquake last night," and he added, "I have looked it up in the *Nautical Almanac* and there is no mention of it."

Now here we are on 23 June 1930. Exactly one hundred years ago Richard and John Lander, two Cornishmen, left Bussa on the Niger and went up northward to Yauri, on reaching which they went by canoe to the mouth of the river, being the first to ascertain where the river Niger emptied itself into the ocean and the first Europeans to map, roughly and approximately, the course of that river. It took them three months to go down, and they had many adventures. Amongst others, they were captured and were held to ransom, being ultimately ransomed by a chief near the coast. They described their journey very graphically and said that during part of it they came to a placid part of the river where "the magnificent Quorra appeared to be slumbering in its own grandeur." Now that is something this Society must never do; it must never slumber in its own

grandeur, but it must imitate the magnificent Quorra in its quiet, steady persistence in pursuit of its aims.

Lieut.-Colonel HOWARD BURY: It is with very great pleasure that I rise to propose the toast of The Medallists of this Society. I might add, with that spark of mischief that possibly lurks in the best of us, that I have a double pleasure in proposing the toast in that it puts those who are about to reply in the same position that I was some eight years ago. From what I have seen I think they have enjoyed their dinner more to-night than I did on that occasion.

It is difficult to compress within a few words the remarkable feats of those who have been awarded the Medals of this Society, but may I congratulate them not only on their individual deeds but on the collective value of their work, as a whole, to geography. If you examine the work in respect of which the Medals have been awarded you will find that it is as varied as it is valuable, from the barren Antarctic to the flowery valleys of South-Eastern Tibet, from the great glaciers of the Ross Barrier in the Antarctic Continent to the innermost corners of Asia. But what is especially pleasant is that the Awards are not made to geographers of only one country. We have with us Mr. Carsten Borchgrevink, who has been awarded the Patron's Medal and who is one of Norway's sturdy and gallant scientific explorers. We have M. Emmanuel de Margerie, one of our valiant allies across the water, still separated from us by an uneasy stretch of sea, under which, up to now, we have no tunnel.

Mr. Carsten Borchgrevink has been awarded the Patron's Medal for his pioneer Antarctic work in the years 1898 to 1900. He organized and led the *Southern Cross* expedition, and, in spite of the fact that he was told it was an impossible feat, he was the first to spend a winter in Antarctic regions. He was also the first to travel over the great Ice Barrier. Nevertheless, it was not till after Scott's second expedition in 1912 that the value of Mr. Borchgrevink's preliminary work was fully realized or recognized. It was only then that it became apparent that justice had not been done to his early exploration. But I would assure him of this: that though recognition has been long delayed, yet to-night it is all the more sincere.

The Founder's Medal has been awarded to Mr Kingdon Ward whose name is very well known to all of us in connection with his great geographical explorations and work on the botanical distribution of plants in the valleys of South-Eastern Tibet and South-West China. The main object of his journeys was the collection of plants and seeds, but, in addition, he spent a great deal of time in surveying and in mapping those practically unknown valleys, and that difficult country through which he was journeying. Perhaps his most remarkable journey was that made in 1924 when with Lord Cawdor he nearly completed the traverse of those Tsangpo Gorges which have hitherto defied the final attempts of every one. Mr. Kingdon Ward has written most delightfully about that journey in his book 'The Riddle of the Tsangpo Gorges,' but what we and, I think, every gardener in this country has appreciated is the fact that he brought back from that expedition a large collection of the seeds of the blue poppy known as *Meconopsis Baileyi*. This year in my own garden I had a mass of plants of that poppy in full flower, standing nearly as high as my shoulder, with five or six blooms on each stem of the most intense and glorious blue. I should advise every one to ask Mr. Kingdon Ward if he has a few seeds to spare. We congratulate him on his work. We have been delighted with his book, but we are still more delighted by what he has brought back to us from his expeditions.

M. Emmanuel de Margerie has been awarded the Victoria Medal for his distinguished contributions to the science of land forms. This medal is given for scientific work rather than for exploration or geographical work. Since the year

1888, that is for some forty-two years, M. de Margerie has been working on the dislocations of the terrestrial crust and towards the elucidation of those problems of geomorphology which are of equal importance to the geographer and to the geologist. Only recently M. de Margerie has written a very interesting study of the Himalayan and Central Asian formations, which he has settled for many of us. M. de Margerie holds a very high position indeed in the records of scientific study which make him a most worthy recipient of the Victoria Medal. May we offer him our *félicitations*.

I ask you now to rise and to drink to the toast of The Medallists, coupled with the names of Mr. Borchgrevink, Mr. Kingdon Ward, and M. de Margerie.

Mr. CARSTEN E. BORCHGREVINK in responding said: Some time ago I was asked in my own country, Norway, to deliver the speech in commemoration of Liberty Day on May 17. In considering my speech, I wondered if I should recapitulate history, as had been done on that day for years in succession, but I decided to speak of the importance to the nation and to the individual of celebrating traditions. I do not think that any one so fully recognizes the importance of traditions to look back upon as do Arctic and Antarctic explorers, traditions of men who before us have trodden a pathway into the ice and snow and endeavoured to wrest some of the secrets from Nature.

Looking round this gathering to-night and seeing so many eminent men who have rendered excellent service to geography, I cannot but miss several whose faces I knew thirty years ago when I returned from the South, and I should like on this occasion to recall the names of some of those great Britons who founded traditions in Arctic and Antarctic history, men such as Sir John Franklin, Sir James Ross, Admiral McClintock, Admiral Ommanney, Sir Clements Markham, and, lastly, my dear friend Robert Scott. Not only do Arctic and Antarctic explorers but whole nations owe a deep debt of gratitude to those men for what they did. All explorers know how much they depend upon the work of others and how much they are helped in their difficulties by the experience of those who have gone before. I have experienced such help in the Antarctic. There are two sides to the pioneer's work. On one side the difficulty of making fresh tracks; on the other, the charm of treading on virgin soil with the chance of making new and startling discoveries. I must add that those who have worked with me, British and Norwegians, have always been up to what they had to do and worked well together.

Now I have a confession to make, for I have kept something up my sleeve for to-night, namely, that I am half a Briton. When I first began to organize my expedition in the city of London, I ran a great risk of being burnt, as one of my forefathers, Bishop Ridley of London, was burnt at Oxford. I was afraid the same might happen to me, but now I have received the high distinction conferred upon me by the Royal Geographical Society, and I suppose it may be said we are quits.

Once more I thank you, Mr. President, for the kind words you spoke to me this afternoon, and Colonel Howard-Bury for his kind remarks this evening.

Mr. F. KINGDON WARD also responded and said: There is a saying in England: "Sailors don't care." I am afraid that does not apply to explorers; certainly not to me, but perhaps that is because I am a bad sailor. The explorer is supposed to have been exposed to every form of discomfort; most of us have suffered from the bites of innumerable carnivorous fauna. We have all lived in countries which were too dry or too hot or too cold, but I have never previously experienced the feeling I have to-night of being hot and cold all over at the same time. However, I join Mr. Borchgrevink in thanks to Colonel Howard-Bury for the very kind words he has used.

If I might for a moment speak of exploration I would like to say that there has recently been some talk in the Press of mountains higher than Mount Everest; at least two mountains have been cited as exceeding the height of Everest. This provides an opportunity of drawing a rather necessary distinction between two distinct but at the same time related aspects of geography. The explorer who is out for business and finds a high mountain, puts it down on a map, or is supposed to do so, and measures its height with the best instrument available. If he does that nobody can gainsay him. If he merely returns and says he has found a mountain, that is merely an assumption and one that is likely to be shattered by the scientific geographer who has never been anywhere near the mountain. He does not say the mountain does not exist but brings forward a series of arguments to show that the chances against it are pretty strong. Many years ago Sir Sidney Burrard pointed out as regards South-Eastern Asia that where a big river cut through the Himalaya it indicated a point of excessive elevation. He predicted that the Tsangpo where it forced its way through a Himalayan range cut through near a high mountain. Many years later that prediction was fulfilled with almost the accuracy of astronomers finding a planet by mathematics. It is true that the mountain was not one of the highest in the world, but it was, as Sir Sidney Burrard had said, a very high mountain. Actually the very highest mountains we know are not on big rivers or near big rivers; but where big rivers have cut through, as Sir Sidney Burrard said, there are high mountains abutting. That is one certain ground on which to work in South-Eastern Tibet. I would say that while the coming generation of explorers may not have to conquer mountains higher than Mount Everest, there are high mountains in certain parts of South-Eastern Tibet, but they are not where the two mountains which have recently been brought to our notice are situated.

If, as seems likely, from certain of these theoretical considerations the Himalayan axis is prolonged towards the Brahmaputra, then another river, the Salween, must cut through that axis, and possibly another river beyond that, the Mekong—both big rivers. I would say to all the young explorers that I see here this evening: Here's your chance of going out and finding something that will rival Mount Everest. Go out and discover where the Salween crosses the theoretical prolongation of the Himalayan axis and you will find a very high mountain.

The kindly Secretary of this Society warned me that I should not speak for more than two minutes. I hope I have not trespassed. In any case, I will take the advice given on a certain pulpit in America. The residents of a certain place have built themselves a church, but not having a resident padre they are in the habit of inviting itinerant padres to preach to them. In order to protect themselves they put up the following notice on the pulpit: "Those who fail to strike oil in two minutes are requested to stop from boring the congregation."

M. Emm. de Margerie also responded and said: The award of the Victoria Medal, conferred by the Council of the Society, constitutes indeed an event in the career of a geographer. In looking at the list of my seventeen predecessors, I notice quite an imposing number of masters in various branches of our beloved Science. I feel deeply honoured by joining that band of distinguished men, it being my privilege, at the same time, to be introduced among their ranks as the first representative of France. Allow me to say that a part at least of the distinction you have been so generous as to let fall on my shoulders goes to my native country, and to the methods of approach—clear, logical, and orderly—which in the study of the Earth's surface, and more particularly in the analysis of land forms, are characteristic of the French school.

In that borderland between geology and geography we owe much to the great

exponents of British thought, from the time of James Hutton down to the present. Moreover, a very large proportion of the facts on which our generalizations are based have been accumulated through the unceasing efforts of explorers working under the patronage of the Royal Geographical Society. Speaking from my own experience, I must acknowledge that among my earliest sources of inspiration were Sir A. C. Ramsay's book on the 'Physical Geology of Great Britain' and Sir Archibald Geikie's 'Scenery of Scotland.' If I may be permitted to add, on account of the conformity of language, a few American classics, you will realize that my mental equipment has been largely of Anglo-Saxon origin.

May I point out another, though somewhat circuitous, connection between my work and Britain? The greatest writer in the domain of the Earth-Sciences who lived during the second half of the nineteenth century, my cherished old master, Edward Suess, although, as every one knows, of Austrian descent, was born in London. Having devoted a large part of my life to translating into French Suess's masterpiece, 'Das Antlitz der Erde,' published under the title of 'La Face de la Terre,' it is a special gratification to me to think of yet a new link with England through the medium of such a commanding personality.

There is a different line in which I have always felt deeply interested, one which has both scientific and artistic characteristics, namely, cartography. It was for me a happy year when some part of the work in connection with the Map of the World Conference fell to my lot. I notice with special pleasure that among the seventeen Medallists selected between 1902 and 1928, no less than eight were cartographers.

In conclusion, Mr. President, let me express both to the Council and to yourself my deep feeling of gratitude. Few marks of encouragement could be dearer to my heart than this beautiful Medal, bearing, as it does, the venerable and illustrious name of your great Queen, Victoria.

Dr. T. G. LONGSTAFF: I have the honour to propose the toast of The Guests, and I name first their Royal Highnesses the Prince Damrong and the Princess Boon of Siam. His Royal Highness is no stranger to us. He is our Senior Honorary Member. He is the representative of a country which has known how to make use of Western geographers without adopting methods such as are quite incompatible with the more ancient civilizations and the older traditions of his own land. One of the more barbarous customs of our Western civilization is after-dinner speaking. This custom was prevalent also in China long ago, but it was abolished because that very practical people found that it interfered with the appetite of the speakers and with the conversation of the other guests. But the sympathetic traveller finds nothing strange in any tribal custom and will conform to his own, however peculiar they may seem to other people. Fortunately for me, this is a purely scientific gathering, and I am therefore relieved of all consideration for social precedent, so I can avail myself of strictly scientific and logical classification of our numerous guests.

We will adopt, if you please, the system of Eratosthenes and take the elements —the air, the water, the Earth—as provinces of geography. In these great days of scientific achievement which have given us the giant bombing 'plane, the gramophone, and the cinema, let us as geographers recall that the calculation of the circumference of the Earth—a mass of some 25,000 miles—which was made by Eratosthenes more than two thousand years ago, was correct within 200 miles. We may congratulate ourselves that in twenty-one and a half centuries we have improved to the extent of 195 miles on that calculation.

Well, the first of the elements in our classification is the air, represented by Lord Thomson, Her Grace the Duchess of Bedford, and by the Dean of St. Paul's. Dean Inge is a firm believer in the possibility of our attainment of the very highest

levels in that element. We look to him for guidance as to our future progress in that direction. The Duchess of Bedford, although she confines herself to a somewhat lower altitude, is always prepared to fly anywhere at any time and invariably reaches her objective, however distant that may be. As to the Secretary of State for Air, I take the opportunity of putting to him a very pertinent request. I am afraid that Mr. Hinks did not fully instruct Lord Thomson as to the constitution of the Royal Geographical Society. Our Society may, roughly, be divided into two categories, geographers and explorers. The interests of those classes are not identical: in some respects they are absolutely opposed. Explorers, for whom I venture to speak, have very little space left in which to practise their hobby. Geographers, on the other hand, desire to see the blank spaces eliminated from the maps. Now I respectfully beg Lord Thomson to hold the balance evenly between explorers and his myrmidons of the air. At the same time, I regret to say that only a few months ago those same myrmidons of his brought back from a certain Empty Space photographs of a little city the very existence of which was absolutely unknown to any European. Now I ask you, is that playing the game? What about the explorers? The very least that he can do—and with some knowledge of official customs I am sure he will do it—is to prohibit the publication of the photographs so that our enemies the geographers shall not be able to gloat over them; so that some day or other somebody shall be able to go and discover that place.

The second element of our classification is the water. Admiral of the Fleet Sir Osmond Brock represents the Navy, which has done more than any other single agency in the world to further geography. We trust that, however much the Navy may be reduced, it will still carry on its great tradition. Lord Ritchie is Chairman of the Port of London Authority, still, even in these hard times, the metropolis of merchants, and how many famous merchant ships have sailed from the Thames on voyages which have enriched our knowledge of geography! The Duchess of Bedford recurs in this element also, for she is at home upon the waters as in the air.

Our third element, the Earth, has a galaxy of representatives. Again in this third category we find the Duchess of Bedford, and here she is noteworthy as an explorer of the natural history of northern lands. In these days when Science is shut up in watertight compartments it is, indeed, refreshing to find some one who ignores such limitations. The Army, which has given us a long roll of great explorers, travellers, and cartographers, is represented by Sir Walter Braithwaite and Sir Herbert Creedy. When it becomes necessary to abolish the Army in order to augment the ranks of the unemployed, we trust that the Ordnance Survey Department, with its great traditions, and the Geographical Section of the War Office will still be spared to us. Sir Robert Vansittart represents the Foreign Office, and here again our invitation is not solely altruistic. Even if we cannot expect his office to forgo the official veto as regards exploration in certain directions we trust that, after this dinner, he will turn a blind eye on unofficial travels. Professor Mawer is the moving spirit of the English Place Name Society. He is doing for British geography what the Dictionary of National Biography has done for biographers and what the Oxford English Dictionary has done for the language. Geographers, historians, antiquarians all look forward to the completion of his great work. In the President of the Royal Academy we had hoped to salute creative and imaginative art. We recognize that there have been quite a number of travellers who have attained to art of some sort or another although they may not have attained to that notoriety in the popular press which is so dear to many.

In addition to honouring tribal customs, all wise travellers endeavour to make friends with the ruler of the country in which they are sojourned, and we at Lowther Lodge have been completely successful. The Mayor of Westminster

has given us many favours. We look for more to come. To Sir Percy Shepherd we express our gratitude for the splendid entertainment given by the Lord Mayor and Corporation of the City of London at the International Geographical Congress, hospitality and courtesy which, I can assure him, was appreciated equally by the foreign delegates to the International Congress and by the Council of our Society. Mr. George Kennedy is the accomplished architect of our new Hall and Library. We congratulate him both on his art and upon his ingenuity in adding a new block to an old building without any incongruity. The completion of his work marks the success of Lord Curzon's and Dr. Hogarth's plans and will vastly increase the amenities of our Society.

Mr. President, I propose the toast of our guests, including the ladies whom I have not ventured to mention and including the private guests of all individual Fellows here to-night. I couple with the toast the name of H.R.H. Prince Damrong of Siam and of the Dean of St. Paul's.

H.R.H. The Prince Damrong: On behalf of the guests I thank you for your kind remarks and the distinguished company assembled here to-night for the honour they have done us by drinking our health. As a foreigner coming from a far-distant country I am not competent to say very much about the Royal Geographical Society, but I should like to say a few words in one connection. Forty-two years ago the Society was kind enough to elect me as an Honorary Corresponding Member in recognition of my responsibility for Siamese surveys. Ever since my election I have taken a keen interest in the work and welfare of this famous Society, but living so far away, and not competent at exploration, all I can do to help the Society is to help all explorers who visit my country. That I have done with the very greatest pleasure. Besides that I have presented the *Geographical Journal* to the National Library of Siam in order that my countrymen should benefit from the knowledge the members of the Society accumulate. There is however one ambition that I have not been able to fulfil, namely, to attend such a function as this. I visited London in 1891, but too late for your meetings, and I went away greatly disappointed. This year I arrived just in time to attend the lecture on Petra and also to attend this important function. You have always been very kind to me and I thank you most heartily for the further kindness you have extended to me to-night. It will always remain in my memory.

Dean Inge: I can hardly imagine any one more unworthy to be the representative of the Guests of the Royal Geographical Society than myself. It is true that I could pass quite a good examination paper on such questions as "Give the heights of K_2 and Kangchenjunga, Kilimanjaro and Popocatapetl, Mount Erebus and Hampstead Hill." But as to scaling any of those peaks, I leave that to others. Such a feat would combine all the elements of discomfort, cold, heat, hunger, fatigue, danger.

While every geographer is able to take a bee-line through the trackless jungle of the Congo forests or over the dreary wastes of the Gobi Desert, I always lose my way in the Connaught Rooms. Nevertheless, I have a vivid recollection of two most brilliant lectures by Sir Francis Younghusband on the Mountains of the Karakoram Range. Those stupendous summits viewed through a magic lantern, which is the best way of enjoying any mountain, are truly sublime. Since it is late, may I just say that your guests, Sir, have enjoyed their evening, they have enjoyed their dinner, and they have enjoyed their company, and that they thank you very heartily.